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State's largest SOLAR GARDEN COMING TO FRANKLIN, NH

By Thaddeus Rumple and Emma Rumple

NHSolarGarden.com is a New Hampshire developer with a story we can only call astonishing.

Andrew Kellar started the company a little over a year and a half ago, but his earlier life experience prepared him for it well. He started Simply Green, a New Hampshire biofuel company, in 2007. He also helped found Green Alliance, which benefits environmentally conscious businesses and customers. He moved on from those to go to work with the UNH Green Launching Pad, a program to help young cleantech companies evolve; he was the entrepreneur in residence. After that, Kellar worked on growing Revolution Energy, which offers custom designed energy solutions.

During the course of all this work, Kellar learned about solar technology, tax structures, third party ownership, and more. New Hampshire had very little available as incentives for solar, and no net metering, so he moved into the Massachusetts market. There he put together a large portfolio of solar projects, but he soon wanted to do more work in New Hampshire.

Rules started to change in New Hampshire as the laws and rules on group net metering started being developed, two years ago. About that time, Kellar transitioned away from Revolution Energy and started NHSolarGarden.com.

Knowing that group net metering was likely to come soon, Kellar began to ready his business to take advantage of the boom in solar garden development he was sure would follow. He started getting potential solar gardens set up with future stakeholders, doing the basic design work, identifying potential sites, finding the best installers, making arrangements with utilities, and applying for permits based on that expectation. All this work could have been lost, if things had gone awry, but they did not. And so when the rules were finalized this year, NHSolarGarden.com had 25 megawatts (MW) of solar gardens in the queue, waiting to be installed.

There was a sense of urgency in this. The federal incentives terminate at the end of 2016 and might not be renewed. To be able to take advantage of the incentives, installations must be completed before the end of that year. Community gardens do not appear overnight; they require a fair amount of preparation, which can go on for months. Any project not started quickly might not make the deadline. NHSolarGarden.com's projects are ready, however. Construction will start in the late summer of this year. The hope is that

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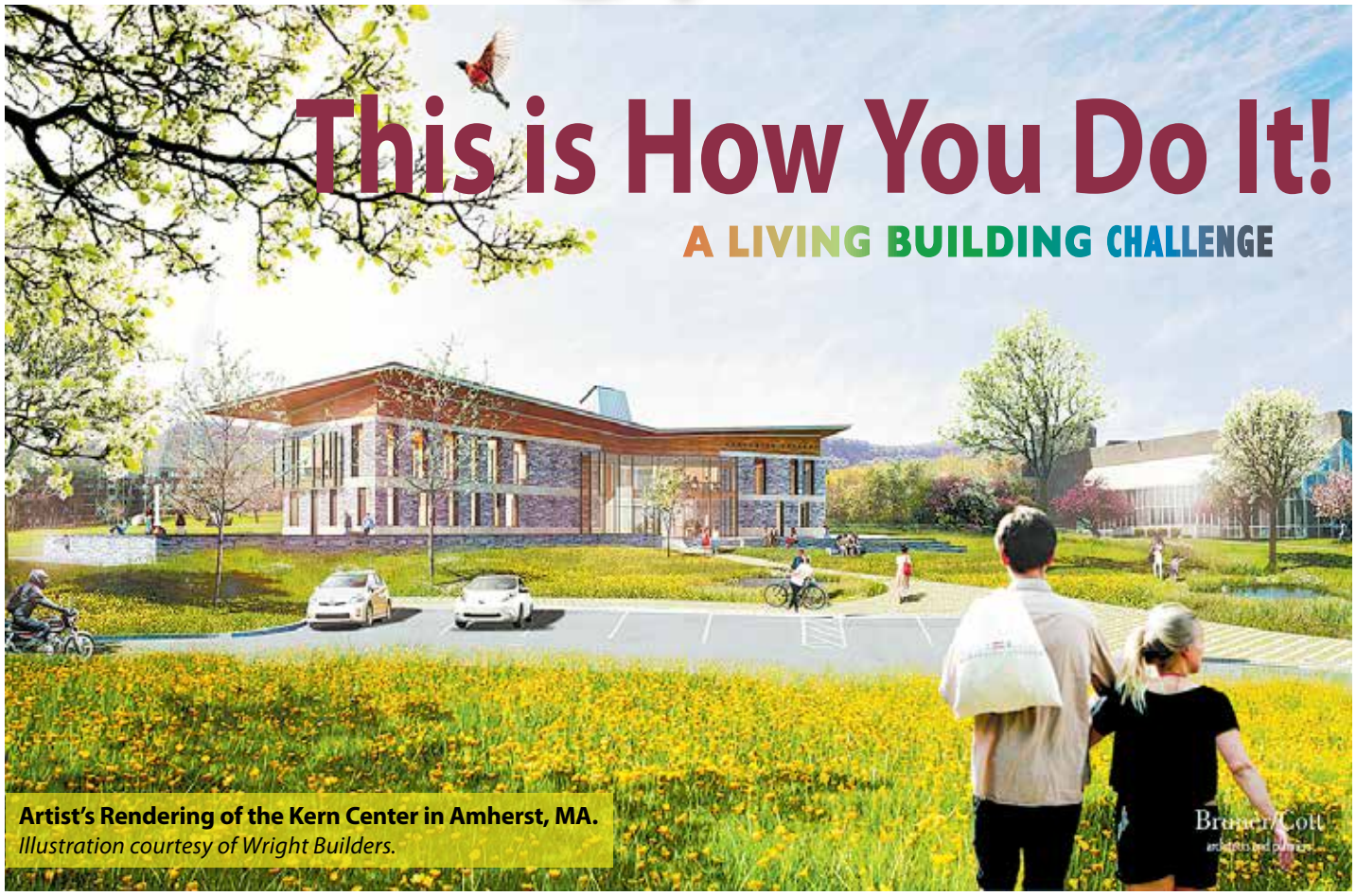

Artist's Rendering of the Kern Center in Amherst, MA.
Illustration courtesy of Wright Builders.

By George Harvey

Many of us might be unaware of the Living Building Challenge (LBC). It is an international building certification program that was developed in the United States and Canada by the non-profit International Living Future Institute in 2006.

Very likely the toughest green building standard, the LBC considers just about every aspect of a building's existence. It requires documentation on everything from where materials came from to how a building performs over time. Issues considered include efficiency, energy, and the environment, but there are other concerns ranging from aesthetics to ethics.

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The Silent World War ...

By George Harvey

US aircraft fly above oil fields set on fire by Saddam Hussein's forces in Desert Storm, commonly referred to as an oil war. US Air Force photo. Public Domain.

Oil wars have been fought since the 1930s. Bolivia, backed by Shell, fought Paraguay and Standard Oil, over what they all believed was a rich oil field. Possibly as many as 130,000 people died over land that turned out not to have oil after all.

American involvement in World War II started because the Japanese needed oil to support their war in China. Access to the nearest large oil fields was potentially blocked by American presence in the Philippines. So the Japanese bombed our fleet at Pearl Harbor to put it out of action while they conquered Indonesian resources.

We have recently seen oil wars in Iraq, Kuwait, Afghanistan, Nigeria, Syria, and Ukraine. However, all these are merely small parts of a larger conflict. It is not a traditional shooting war. We might call it the Silent World War, because it is barely noticed. But it is being fought in nearly every country.

When we look at the numbers, we can see it is on a scale comparable to World War II. The World Health Organization tells us that nearly twenty thousand people die every day, from effects of air pollution, as corporations fight to maintain a "right" to dump pollutants into the air we breathe. Nearly all of us are casualties to some degree; in the European Union, a report from the BBC says, fossil fuel pollution robs the average person of nine months' life expectancy. Entire species are being killed off at a rate rapidly approaching a hundred each day, as the fossil fuel industry staunchly defends its "right" to finance campaigns of chosen representatives, to guide legislatures, and to promote irrational denial of science.

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Our mission is to create Energy Awareness, Understanding and Independence - Socially Responsible Living.

Solar Power works! . . . anywhere! under the sun!

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Green Energy Times would like to thank everyone who has submitted articles or helped in any way to make this all a reality. We want to also thank our advertisers & ask that you support them. Say that you saw them in *Green Energy Times*. Now let's all G.E.T. moving ahead towards a clean, renewable future - one where our children & grandchildren will be able to breathe & grow, live & love on this beautiful planet where we live.
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GEORGE HARVEYS Energy news ~ Noteworthy Tidbits

At greenenergytimes.org there are daily posts with links to articles. Here is a selection of those we found most interesting this summer:

June 18

Pope Francis in St. Peter's Square. Photo by Gabriel Sozzi. Creative Commons Atribution-Share Alike 3.0 Unported license. Wikimedia Commons.

June 18 – Pope Francis has clearly embraced what he calls a "very solid scientific consensus" that humans are causing cataclysmic climate change that is endangering the planet. The pope has also severely criticized global political leaders for their "weak responses" and lack of will over decades to address the issue.

July 1 – The state of New York has now officially banned fracking completely, nearly a year after communities won the right to ban oil and gas development locally. This action has concluded the New York Department of Environmental Conservation's comprehensive, seven-year review.

July 2 – Coal is no longer king in America, according to the US Energy Information Administration, which provides independent statistics and analysis of the energy sector. Coal lost its number one spot as the nation's top electricity source for the first time on record this April. Most of the recent loss is to renewable power and improved energy efficiency.

July 8 – In Nevada, NV Energy has lined up what may be the cheapest electricity in the US, and it comes from a solar farm. The Berkshire Hathaway company agreed to pay 3.87¢/kWh for power from a 100-MW First Solar project. Add the value of subsidies to that, and it is still below the cost of most power from natural gas.

July 11 – World seabird populations have suffered a staggering 70% drop over the last 60 years, according to international research. There are currently 230 million fewer seabirds than there were in the 1950s. Most of the decline is due to the effects of fossil fuels or fossil fuel products.

July 14 – ExxonMobil, the world's biggest oil company, knew as early as 1981 of climate change, seven years before it became a public issue, according to a newly discovered email from one of the firm's own scientists. Despite this, the firm spent millions over the next 27 years on research denying climate change.

July 18

Mountaintop removal coal mining filled the valley behind this home. Photo by Flashdark. Released to the Public Domain. Wikimedia Commons.

July 18 – Since the 1970s, the tops of over 500 mountains have been removed and more than 2,000 miles of headwater streams destroyed by mountaintop removal coal mining. Now, the US Interior Department has issued proposed water protection rules that would effectively end the common practice.

July 22 – French lawmakers adopted a long-delayed energy law to reduce the country's reliance on nuclear reactors and lower carbon emissions by cutting the use of fossil fuels. The sweeping energy transition law reflects a three-year-old campaign pledge by President François Hollande to cut nuclear power and increase renewables.

July 22

Four solaire Félix Trombe Solar power engine in Font-Romeu, France. Creative Commons Attribution-Share Alike 2.5 Generic, 2.0 Generic and 1.0 Generic license. Wikimedia Commons.

July 26 – An International Monetary Fund study says worldwide energy subsidies are much greater than previously known. The combination of direct and indirect subsidies is projected at $5.3 trillion in 2015. Most of this supports fossil fuels and arises from countries setting energy taxes below levels that fully reflect damage to the environment. Country-level estimates are available.

July 28 – The Federal Energy Regulatory Commission issued its monthly report on new US generating capacity. CleanTechnica added a careful estimate of new rooftop solar capacity, and here are the numbers for June: 44% of new capacity came from wind power, 41.5% came from solar power, 13% was biomass, and 2% was natural gas. Overall, for the first half of 2015, renewables accounted for 78.4% of new capacity.

August 1 – Dr. James L. Powell, director of the National Physical Science Consortium, examined titles and abstracts of more than 24,000 peer-reviewed scientific articles on climate change published during the past couple of years. He identified 69,406 authors named in the articles. Only four of them rejected the fact that human emissions cause climate change.

August 3 – The Obama administration unveiled its Clean Power Plan, which is aimed at a large reduction in greenhouse gas emissions. The Clean Power Plan is the final version of Environmental Protection Agency regulations, which have been the subject of public input to the EPA. President Barack Obama called it "the biggest, most important step we've ever taken to combat climate change."

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A Review of the U.S. Clean Energy Plan

By George Harvey

On August 3, after months of public review of a draft proposal, President Obama unveiled the Clean Energy Plan of the Environmental Protection Agency (EPA). It had a few surprises, including taking a more stringent stand than the draft proposed. The final plan calls for a reduction of 32% in our carbon dioxide emissions from 2005 levels by 2030. This is a somewhat greater reduction than the 30% originally called for. The plan is also less supportive of natural gas than expected, and gives states a somewhat longer timetable for coming up with their own plans.

The plan was immediately attacked by the fossil fuel industry, along with its dependent utilities. It was also attacked by the states that are most dependent on fossil fuels in their economies, and sixteen states have banded together to fight it. Their claims are that it is illegal because the president had no authority to issue such a plan, it would require an act of Congress, it would be unconstitutional, and would cost too much to implement.

It might be good to take a look at the history of the issue.

In 1970, President Nixon undertook a series of steps to improve environmental protections. The Clean Air Act of 1970 was passed by Congress, and President Nixon proposed the EPA as an agency to implement it and Congress enacted it. In doing this, he was following a long tradition of environmental action undertaken by presidents in his party. Lincoln signed the Yosemite Grant in 1864. In 1872, Grant created Yellowstone National Park, said to be the first national park in the world. Theodore Roosevelt created of the first federal wildlife refuge at Pelican Island in 1903. Eisenhower signed of the Clean Air Act in 1955. This is a tradition some in their party might well study today.

In 2003, the EPA determined that it had no authority to regulate carbon dioxide emissions. This quickly resulted in a lawsuit, Massachusetts v. Environmental Protection Agency, which was actually brought by fourteen states, along with a number of cities and environmental organizations. The purpose of the suit was to force the EPA to regulate carbon dioxide and some other greenhouse gases. In the case, the Supreme Court decided that the EPA's 2003 determination was faulty, and it ordered the agency to review the matter. The EPA then determined that it had to regulate carbon dioxide and some other greenhouse gases, a position that was upheld by a court of appeals in 2007. The EPA recognized that climate change had been going on for at least half a century and needed to be regulated, and these views were upheld by the court.

The federal court determined that carbon emissions are dangerous and ordered the EPA to regulate them.

In 2010, the EPA issued a set of regulations on carbon emissions from power plants, industrial plants, and vehicles. These were immediately attacked in a lawsuit, Utility Air Regulatory Group v. Environmental Protection Agency. Here, the Supreme Court upheld the ability of EPA to regulate carbon emissions, to a point. The court was divided into three camps on this, with different dissenting voices on different parts of the decision. Nevertheless, the EPA's ability to regulate emissions from large plants was confirmed. What was not confirmed was its ability to regulate carbon emissions from small plants, including most vehicles. The dividing line is a potential to emit 250 tons per year of any pollutant. To give an idea of what this means, 250 tons of carbon dioxide is produced by burning 25,000 gallons of oil; an industrial plant does not have to be very big to burn that much. The ruling was issued in 2014. Following these court actions, the EPA had no choice but to regulate emissions from the utility industry.

The authority of the EPA to govern carbon emissions was confirmed by the Supreme Court in 2014.

The Clean Energy Plan is a high-level

Cont'd on p.7

Rising Seas

By George Harvey

With water ten feet deeper as the new normal, Miami Beach would not be as attractive, with no beach. Photo by Averette at English Wikipedia.

James Hansen is the legendary NASA climate scientist whose testimony before the United States Congress first made many people aware of climate change in 1988. By then, he had already identified one culprit in the process, the greenhouse gases in the atmosphere that trap the sun's energy, warming our planet. Since that time, he has engaged in a series of studies, both for NASA and, most recently, as a climate activist. It is worth noting that he retired from NASA because, he said, "as a government employee, you can't testify against the government."

Most recently, Hansen and sixteen other top-rated scientists jointly published a paper on melting polar ice. They describe a feedback loop, in which the colder fresh water melting from polar ice pushes warmer salt water against the ice, causing it to melt faster.

The paper was published through an unusual mechanism, because its authors wanted to make it available to governments at the United Nations Climate Change Conference (COP 21) in Paris, which begins on November 30, 2015. Instead of having the paper peer-reviewed and published, it was made available online, to be reviewed by scientists. At the same time, anyone who wishes can follow the whole process at home. It can be viewed at bit.ly/Hansen-2015-climate-paper as a 66-page pdf file.

The paper was intentionally exposed to extremely close scrutiny. We can bet that just about everyone who has some reason to want to show climate change is a hoax will weigh in. The peer review process is open to qualified scientists, but there will no doubt be a lot of commentary by people outside the scientific disciplines involved at various venues on the internet.

The report, "Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2° C global warming is highly dangerous," is alarming. Assuming it is correct, coastal areas are in worse trouble than we had thought. It says the ocean rises that predictions say could swamp coastal cities around the world will not

Cont'd on p.25

Tesla Model X

By GET Staff

The latest news we are getting from the West Coast is that the Tesla Model X is on schedule for release in September. In fact, the word is that factory tours have been put on hold while finishing touches are done before production actually begins.

Over 20,000 of the cars have been reserved. The cost of reservations is $5,000, so we can be certain that the people who have made reservations are serious. Given the car's features, this should be no surprise. The Model X is a crossover car, combining features of station wagons with SUVs. This makes it a somewhat heavier vehicle than the Model S, which has been so successfully marketed in the past couple of years. Its batteries will be the same as those of the Model S, so we might assume that the car's range will be similar.

It will seat seven adults, so it is a fairly large passenger carrier, but it accelerates from 0 to 60 miles per hour in 3.1 seconds, making it a very peppy large passenger carrier. Its styling is also worth notice, with gull-wing doors that open upward, but offer plenty of room to get in and out.

Even with the advance sales, however, Tesla is offering incentives for current owners of their Model S to persuade others to buy the Model X. Each sale, up to a maximum of ten, gets the person referring new customers $1000. The referral program is in place in some countries aside from the US, including Australia.

Initial expectations on the Model X were that it would be released in late 2013 or 2014. While the production delays have added to Tesla's reputation of being slower than they had hoped, the current word is that the Model X is slightly ahead of the most recently established schedule.

Tesla Model X front view. Photo by Don McCullough from Santa Rosa, CA, USA. Creative Commons Attribution 2.0 Generic. Wikimedia Commons.

The factory in which the Model X is to be built is in Fremont, California. It is remarkable for the numbers of robotic machines it has on the assembly lines. Some of the robots are very large, designed to lift cars onto and off of the assembly lines. These machines have names taken from the Marvel Comics X-Men superheros, including Wolverine, Iceman, and Thunderbird. It seems Elon Musk may be a fan.

While there will be three or four times as many robots on the Model X assembly line as there were on the one for the Model S, there are still a number of people who will work on production. Recent reports spoke of busloads of employees being taken to the plant for training.

Tesla's Fremont car factory is said to be the second largest building in the world, based on its footprint. The Gigafactory, in which the Powerwall batteries will be manufactured, is a separate factory at a different location. It is reported to be ahead of schedule.

Citizen "Deputies" Considered for NYC Idling Law

The Environmental Defense Fund reports that idling vehicles in New York City emit 130,000 tons of carbon dioxide every year. The Natural Resources Defense Council (NRDC) reports that idling engines burn more than 10 billion gallons of fuel per year nationwide.

Anti-idling advocate George Pakenham, producer of the documentary, Idle Threat, and two NYC council members have initiated an effort to allow concerned citizens to earn thousands of dollars under NYC's poorly enforced idling law by videotaping vehicles idling illegally. Bill # Int 0717, proposed in March 2015, would allow people to submit video evidence of idling to the city and pocket up to half of the fines imposed on rule-breakers. This could mean hundreds of dollars per fine.

The bill would require the Department of Environmental Protection to set up a page on their website where individuals could submit video of violations of the city's anti-idling law. For those videos that lead to a civil penalty for the violator, the individual who submitted the video would be entitled to 50% of the civil-penalty amount. It would also raise the fine amounts for a first violation of the City's anti-idling law by approximately 50%, to a minimum of $350 from $220 and a maximum of $1,500 from $1,000 for second violations within a two-year period. Third violations would be more.

Finally, it would require the Department of Environmental Protection to hold training sessions on the requirements for submission of successful complaint regarding the violation of the City's anti-idling law. The fines would be applicable to double-decker buses idling outside tourist attractions, truck drivers leaving engines running while they make deliveries, and individuals to ban vehicles from sitting idle with engines running for more than three minutes on most streets, and more than one minute in school zones, as well.

Under the proposal, individuals would record vehicles, with license plates visible, idling for more than the allowed time period and submit the footage through the Department of Environmental Protection (DEP) website. If the bill moves through the City Council, it could take about a year before it gets signed into law by the mayor.

$525 Incentives Offered For Workplace EV Chargers

The program is designed to encourage electric vehicle adoption in Vermont

The Vermont Clean Cities Coalition (VTCCC), of Burlington, VT, with the support of the Vermont Public Service Department, is offering a Workplace Electric Vehicle (EV) Charging Station Incentive Program to help workplaces mitigate the costs associated with the installation of electric vehicle charging stations (EVSE). Workplaces which install a Level 1 (110/120v) or Level 2 (208/240v) charging stations may apply for the $525 incentive. This incentive is available for installations completed by April 15, 2016.

Workplace EV charging stations:

- Increase access to EV charging for employees, thereby minimizing EV range anxiety;
- Demonstrate the employer's leadership to employees, customers and the surrounding community;
- Further employer goals for improving employee commuting practices and reducing greenhouse gases and other vehicle emissions;
- Enhance employee benefits packages and help employers recruit and retain employees.

Workplaces represent the second most common place (after the home) for EV owners to charge their vehicles. A U.S. Department of Energy survey found that employees of companies with at-work charging are 20 times more likely to drive a plug-in car than those who work at companies with no provision for electric-car charging.

In order to be eligible for this incentive, workplaces must be located in Vermont and be the property owner or have the express permission of the property owner to install an EVSE. Additionally, a completed Electric Vehicle Charger Incentive Request Form along with a copy of the installation quote must be submitted to be considered. The EVSE must be new, have a dedicated circuit of 30 or more amps, and comply with all city, town, or state government rules, codes, and regulations. Inspections or permits may be required by the city or town where the business is located. VTCCC can offer a maximum of one incentive per business.

For further information, please visit www.uvm.edu/vtccc/electric-and-hybrid or call Abby Mattera at (802) 656-9123.

The Vermont Clean Cities Coalition (VTCCC) is part of a nationwide program sponsored by the U.S. Department of Energy (DOE) that aims to reduce petroleum consumption in the transportation sector and support development of infrastructure necessary to make alternative-fueled vehicles a viable transportation option.

Vermont Clean Cities Coalition

CarShare Vermont in Montpelier Has Arrived

In partnership with the Vermont Agency of Transportation, and with support from the City of Montpelier, CarShare Vermont has embarked on a two-year pilot project to place two fuel-efficient vehicles in the downtown to serve residents, businesses, and commuters. You'll now find CarShare cars located next to city hall and the Kellogg-Hubbard Library.

Since CarShare Vermont's launch, over 50 Montpelier residents have joined CarShare Vermont and started to reap the financial, environmental, and social benefits of car sharing. This is a great start, and with your help we're confident that this pilot project will be a huge success. To keep the positive momentum going, and to ensure that CarShare Vermont continues to grow and succeed in Montpelier, we need your help!

Here are a few ways you can get involved:

- ✓ Become a CarShare Vermont member, and encourage your friends, neighbors, and colleagues to do the same. If you've been thinking about ditching a car, go for it – they've got you covered!
- ✓ If you work in Montpelier, encourage your employer to set up a business membership. CarShare Vermont can help businesses reduce work-related travel expenses, while providing an enticing employee benefit.
- ✓ Join our outreach team and help us raise awareness and generate excitement about our service. We need local volunteers to help staff tables at community events, put up posters, knock on doors, post messages on Front Porch Forum, and generally help spread the word.
- ✓ Connect with CarShare Vermont on Facebook, Twitter, and Instagram and invite everyone in your social network to do the same. We use social media to share information, announce opportunities/events, and generally keep people in the loop.

Thank you in advance for all of your support to help make this pilot project a huge success! If you'd like to get involved, please email alicia@carsharevt.org or call (802) 861-2340.

CarShare Vermont is located in Burlington. The phone is (802) 861-2340, and the web site is www.carsharevt.org.

Other resources:

- In Nashua, New Hampshire, www.zipcar.com/nashua/find-cars
- In Portland, Maine, www.portlandmaine.gov/464/Car-Share
- In Albany, New York, www.capitalcarshare.org

carshare vermont

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 carpools, 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 & Travel Training 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**

NH RIDESHARE – Your Source for Transportation Alternatives. **nh.gov/dot/programs/rideshare/**

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 **riderct.org**

STAGE COACH - Commuter buses from Randolph and Fairlee to Dartmouth, Local village buses. 800-427-3553 **stagecoach-rides.org**

VT Rail Plan Quantifies Energy Plan Goal

By Christopher Parker

Amtrak's Vermonter stops in White River Junction, passing a New England Central Railroad freight train. State involvement has upgraded the track used by the Vermonter, paid for its operation, and purchased the White River Junction station and the freight tracks behind it that lead up the Connecticut River Valley.

The new draft rail plan, for the first time, quantifies the 2011 comprehensive state energy plan goal to quadruple rail passengers.

The detailed document includes an inventory of the rail network's condition and needs with a capital plan for rail infrastructure upgrades.

The plan is a requirement of the Federal Railroad Administration and is key to obtaining federal funding. It gives confidence to state and federal leaders that rail projects have been considered as part of the total system needs.

For freight, the plan calls for increasing the weight limit to national standards, work on sidings for customers and yards, and general state of good repair improvements, including welded rail on every mainline and a speed of at least 25 mph.

While the hoped for passenger improvements directly benefit the public, the environmental benefit of moving freight by rail is even larger: rail uses one-third the energy and causes only one-third the pollution of trucking.

To attract the number of riders called for in the state's energy plan, new services will be required. The first priority will be extending the New York to Rutland Ethan Allen on to Burlington and extending the Vermonter to Montreal. The second priority will be another train to Burlington operating via North Bennington, Manchester, and Rutland. Rebuilding tracks through North Bennington is an expensive proposition. The third priority will be a second train on the Vermonter route to Montreal (perhaps a return of the overnight Montrealer, though the plan doesn't specify a schedule).

Extensions of service to Montreal and Burlington add significant destinations to already existing services. From an energy and environmental perspective, this improves efficiency, as well as increasing mobility and providing an economic benefit, bringing Quebec tourists to Vermont without their cars. Currently Amtrak trains add passengers at each stop gradually until they are full in New York – which means many empty seats on the northern half of the runs – which can be filled at little cost with Canadians going to Vermont.

With the expansions in service, ridership is projected to climb from 100,879 (in 2013) to 471,800–623,700 (in 2035). That's a fourfold increase (or more) while the number of passenger trains goes from two to four. As riders we will enjoy better service, while simultaneously a more efficient and better-used network will reduce the environmental footprint per passenger.

The plan also calls for a speed increase on all passenger lines to 79 mph, making the trains more competitive with driving – and also safer since signals would be added.

The Vermont Rail Action Network believes the rail plan is good piece of work. The plan is not a commitment, but a roadmap. It lays out goals that are realistic but a little aspirational; just one step beyond what seems possible in the current funding environment. That's good – the last thing you want is for an important project to not be in the plan when going for funding. For the state to achieve these goals, it will require continuing political will.

Funding challenges are inevitably a theme in the plan. Eighty percent of transportation funding in Vermont is driven by federal priorities (either targeted federal funds or state matches of the same). Federal priorities overwhelmingly favor roads, and total US infrastructure funding is far below the level of most other countries.

The entire plan can be read at: bit.ly/VT-rail-plan. It's a long document, but interesting, with all kinds of information. Comments may be sent to Costa Pappis, the Vermont Agency of Transportation planner who led the planning effort, at costa.pappis@state.vt.us.

Notably missing is any discussion of commuter trains, as commuter train funding comes from the Federal Transit Administration instead of the Federal Railroad Administration.

Christopher Parker has been Executive Director of the Vermont Rail Action Network since 2007. Previously he was a minister and train conductor. His environmental consciousness was first formed in the Chesapeake & Ohio Canal National Historical Park in Maryland.

WIND PROJECT IN NWVT DON'T BE FOOLED

By George Harvey

Some debate has been developing over a wind farm in the town of Swanton, Vermont. Whenever I consider of such a debate, I think of an old Lily Tomlin skit in which she plays Edith Ann, a bratty five-year-old, who forcefully asserts that making up lies is bad, but adds, "You can make up the truth if you know how!"

If you follow the debates over windpower, you will find a lot of people making up a lot of things. With a mix of truth and fancy, it is hard to know how much of what they say actually is true. My advice is never to believe anyone's claims, regardless of how appealing they are (especially to your "dark side"), until you have checked them with verifiable sources.

Some assertions come, resounding passionately, only to dissipate like smoke when people realize how silly they are. Others stick around, such as those that say wind turbines depress values of nearby property, kill birds, and make people sick. All three can be refuted with facts.

When they are refuted, however, anti-wind activists resort to what sound like made-up "truths." For example, the Massachusetts Audubon Society supported Cape Wind because they had determined that wind turbines save many more birds than they kill. When this was pointed out, one anti-wind activist responded by asserting that the Audubon Society had been bought off by "big wind." Edith Ann's made-up "truths" came naturally to mind. (I am not inclined to believe in conspiracy theories, but I wonder whether this activist is caught up in one.)

The question of human health effects provides an excellent reason for caution. After numerous studies appeared in peer-reviewed publications, the Australian Medical Association issued the first position paper on the subject by a national medical organization. That paper said that wind turbines cannot be shown to produce illness. However, stress, such as that coming from anti-wind activists, can cause all manner of illness, and the stress-caused illness around wind farms correlated with stressful activities of anti-wind activists. Wind turbine syndrome, in other words, is a placebo effect; people are told they will get sick, they believe it, and so they do get sick. (see bit.ly/wind-turbine-syndrome-report)

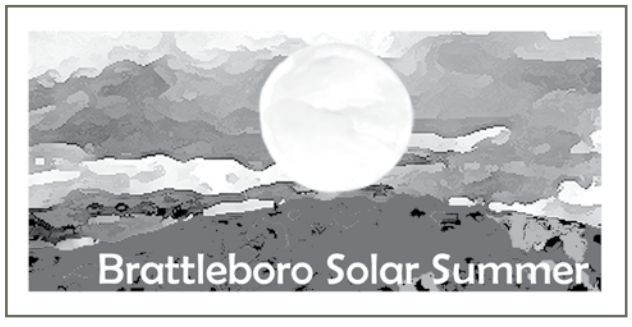
One reason for people to make up assertions intended to slow our transition to renewable power might be that they are in the pay of fossil fuel companies, to produce advertising or provide pro-fossil-fuel political positions. Clearly there are other reasons, and hateful spite might be one of these. Regardless, the Australian Medical Association's position suggests people should consider limiting their exposure to anti-wind activists who might, literally, make them sick.

We have these three pieces of advice. Avoid spiteful people and the stress-filled organizations that can damage your health and happiness. Avoid organizations that function more like mind-controlling cults than groups of thoughtful environmentalists. And think for yourself.

BRATTLEBORO'S SOLAR SUMMER CAMPAIGN GOING STRONG

By Paul Cameron

The Brattleboro Solar Summer campaign is generating lots of interest among Brattleboro residents. The goal of the campaign is to support Brattleboro homeowners, renters, landlords, and businesses in choosing locally generated renewable electricity. The price of solar PV panels is at an all-time low, and new limited-time incentives make solar affordable for all, including the Windham County Solar Loan Program through the Vermont State Employees Credit Union (VSECU), a 30% federal tax credit available through 2016, and a special incentive of $50-$200 per kilowatt offered by the five participating solar installers through September 30. The more Brattleboro residents sign up, the greater the discount.



The cost of electricity will likely continue to rise in the future. You can reduce or eliminate your monthly electricity bills by going solar – the average homeowner will save thousands of dollars over the contract term. Also, solar tax incentives may not be around forever – consider going solar now to take advantage of these low costs. Save money while reducing your carbon footprint!

For homeowners, businesses, or renters who prefer not to have solar panels at their site, buying shares in a community solar project is an option. Individuals and businesses may purchase solar panels located in an offsite solar array, and the credit that the panels generate will show up on their electric bills.

For more information on Brattleboro Solar Summer, contact Paul Cameron at (802) 251-8135 or pcameron@brattleboro.org, or visit www.brattleborosolarsummer.org.

U.S. Clean Energy Plan

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blueprint on how the regulation of carbon emissions is to be done. It establishes quotas for each state, but gives the states the right to come up with their own plans detailing how to achieve them. Alaska, Hawaii, and Vermont are exceptions, for different reasons; in Vermont's case, there are no fossil fuel plants in the state, so there is nothing to regulate.

Senator McConnell, from Kentucky, is leading opposition to compliance. He has told leadership in various states that they should not to respond. The EPA's position is that any state that fails to come up with its own plan will have a plan imposed on it.

Another response came from Ban Ki-moon, the Secretary General of the United Nations. He gave praise for the plan, because it shows that the United States is prepared to take a strong leadership role on climate change prior to the United Nations Climate Change Conference in December.

Another response is perhaps more interesting. Republican presidential candidates have not said much in favor of limiting carbon emissions. As they campaigned in New Hampshire and South Carolina, pollsters asked those voters who were likely to vote in the Republican primary for their views. It turns out that over half of those polled support the Clean Energy Plan, and 60% believe it is important to reduce carbon emissions.

G.E.T. supports the Clean Energy Plan. *(We are assured that Bernie does, too.)*

RENEWABLE ENERGY NEWS

1. Three large shipping containers in an industrial park in Boothbay, Maine have batteries storing enough electricity to run 100 homes for a day, New England's first utility-scale electricity storage system. They are part of a pilot program aimed at meeting peak demand at a fraction of the cost of new transmission lines. (6.8.15 Energy News)

2. The US residential solar market grew by 76% in the first quarter of 2015, compared to a year earlier, installing 437 MW, according to GTM Research and the Solar Energy Industries Association. The US installed 1.3 GW of solar PV across all market segments, despite one of the worst winters recorded. (6.12.15 Energy News)

To read full stories go to: greenenergytimes.org and search for dates or subjects.

SCC Joins Solar Community

Bennington, VT Church Joins the Solar Energy Community

By N. R. Mallery

On May 19, 2015, Solar Pro of Arlington, Vermont completed the installation of 72 roof-mounted solar panels on the Second Congregational Church UCC (SCC) on Hillside Street in Bennington, Vermont. Solar power is expected to produce approximately 20,500 kWh of energy annually, resulting in a 75% reduction of electrical energy costs for the church annually.

"The key incentive which propelled this project forward, in addition to the support of the congregation, was the grant received from Green Mountain Power," commented Mike Day, who is a member of the Board of Trustees for SCC. "The grant was awarded from GMP as the result of a competitive grant application that was designated for non-profit organizations -- for solar projects. We were among the nine recipients that were awarded the grant, and received the maximum award amount of $20,000. It was matched by $40,000 from the church endowment fund."

The grid-tied solar array is mounted on the south-facing roof of the church. Each of the seventy-two 260-watt Canadian Solar panels has an Enphase micro-inverter that converts the current from DC (direct current) to AC (alternating current). The net-metered system is expected to reduce the church's electric costs by $4,100 per year.

The solar project was part of a phased approach toward reduction of the major operating costs for the church. The oil cost was found to be the largest expense, and electric power was the next largest. The boiler replacement, which was their first priority, was completed in December 2014. It involved replacing an old boiler with two more efficient boilers, new variable-speed circulating pumps and the removal of a hot water heater that serviced the three restrooms in the church. Three on-demand electric hot water heaters were installed to provide hot water to the restrooms. The focus of these efforts and the solar project was to place the church in the best position for the future of the congregation and the many groups and organizations that rely on the church and its facilities.

In celebration that the church is now powered by solar, a Sun and Fun! community event will celebrate this achievement on Saturday, August 22nd, from 10 am to 3 pm. It is open to the public. There will be live music, food, and numerous kids' activities including face painting and s'mores made in solar ovens. There will also be opportunities to visit displays by various solar companies, non-profit businesses, and environmentally friendly vendors, including Solar Pro, Green Mountain Club, One World Conservation Center, and 350VT. There will also be lectures, films, and educational material available about the environment, recycling, and composting. The event will be held rain or shine. There is a calm space available for any children needing one during the day.

SCC also serves as a meeting place for many local groups such as the Bennington Children's Chorus, Quiet Valley Quilters, Creative Dance, NA, AA, Grief support, Poverty Work Group, Child Advocacy, Headstart, the Association for the Visually Impaired, Turning Point, and more. For information about the Second Congregational Solar Array or the event, contact Barbara True-Weber or Kathleen Shaw at 802-442-2559. Their website is www.bennscc.org.

Rooftop ballast mounted solar at the Second Congregational Church. Bennington, Vermont. Photo by Mike Day.

The History and Determination of the Harvard Solar Garden

by George Harvey

In 2010, a new law in Massachusetts enabled community Solarize campaigns. For the first time, there was a policy framework to encourage community efforts to decrease dependency on fossil fuels. Many people could move ahead with long-cherished dreams to have their own power from their own solar systems at their own homes.

The most active community in the state was almost certainly Harvard, a bucolic town about twenty-five miles west of Boston. A number of residents had already thought over installing solar systems, only to be discouraged by the complexity of the process. The Solarize Program simplified the work while providing the advantage of a "bulk buy" to reduce system costs.

People soon saw that the Solarize campaign could put the solar dream financially within reach. The campaign came together quickly, as volunteers spread the word, informing people about possibilities and helping sign folks up to get solar systems. Excitement ran high, and the number asking for site evaluations was impressive.

As usual in solar campaigns, many people who wanted systems found their sites were not suitable. Usually the issue was shading caused by anything from trees to dormers and chimneys, but other issues, such as aging roofs can also cause siting problems.

There were about sixty people who wanted to participate in Harvard's Solarize Program, but could not because of physical siting problems. Unsurprisingly, many of these people were both determined and inventive. The idea that residents could have their solar panels in a common installation was born, likened to a CSA but for harvesting photons.

Today, solar gardens are commonplace, but this was in 2011, the old days. For Harvard, it was a pioneering effort in wholly uncharted territory. Today, it is hard to imagine much going wrong, but in those days, everything imaginable did go wrong, along with many things ranging from unimaginable to inconceivable.

There were no great technical hurdles. Steven Strong of Solar Design Associates provided technical guidance pro bono to the Solarize program and helped guide the group forward, shaping the first shareholder-owned solar garden. The state provided a grant of over $150,000. Problems of policy, politics, personality, and ignorance arose in a situation where there were no established guidelines.

The 550 kW Harvard Community Solar Garden is the first shareholder-owned solar garden in Massachusetts . Photos courtesy of Steven Strong, president of Solar Design Associates.

Steven Strong openly admits he was naïve about how extensive these difficult issues could be.

Before the first town planning board meeting addressing the Harvard Solar Garden, many citizens became immersed in bad information. They had been told solar electric power could create an electromagnetic field that would lead to health issues, and a few believed it, ignoring the utility-supplied electricity already running through their homes. Some were misinformed about the mineral contents of solar panels, and believed that rains would leach toxic materials from the glass panels into the water table. These and similar issues had to be addressed seriously within the context of a public meeting.

Resistance from the town's zoning and select boards sent the garden advocates on a nearly circular path, as they tried to find a site for the array. Attempts to use agricultural land failed due to zoning, so they tried commercial. This also failed for zoning as solar was not an "allowed use." Garden advocates were then told that the former town dump was the only place they could site the array. Engineers said this was simply impossible because the dump was in a swamp, subject to differential settlement, and had never been properly closed and capped. However, the select board came to see that project supporters were getting upset. They were reminded that the town had accepted a state grant as a 'Green Community' and were obliged to allow solar "as of right" in the town. After a special town meeting, they finally decided commercial land could be used for the solar garden after all. Finding a supportive owner of commercial land in Harvard was a relatively minor challenge .

The town assessors then threatened to tax the solar array as commercial property. That would have severely undermined the financial viability of the project, but circumventing this required an act of the state legislature. A "home rule petition" was guided through the agonizingly slow process of getting to the floors of the Massachusetts House and Senate. Normally such a petition languishes, but two committed local legislators guided it through. The actual vote took only two minutes in each chamber.

The building inspector then provided another hurdle by setting the highest possible permitting fees, but the next issue was even worse. The bank, which had no experience with loans for solar systems, spent over ten thousand dollars on legal fees looking into the project, before turning down the loan. After finding a more progressive bank that liked the idea and became a subscriber, the next step was to get Verizon, the phone company owning the utility poles, and National Grid, the utility that had to install the electric connection, to talk with each other. That process that took almost six months.

The people who brought the Harvard Solar Garden together worked within a system that had no idea how to deal with them. Nevertheless, after working on policy issues for two and a half years, the first phase of 250 kilowatts (kW) was completed in a little under two months, including site preparation. The next phase, bringing the project to 550 kW, was quicker.

Harvard Community Solar Garden is the first shareholder-owned solar garden. Photo courtesy of Steven Strong.

Steven Strong likes to point out that while the Harvard Solar Garden operates like a cooperative it is structured as an limited liability corporation, with the subscribers as the only shareholders. It was the first such solar project, and is still the only truly shareholder-owned one in Massachusetts. He says this is an ideal model because it keeps all the benefits local. "I see the solar garden as the great democratization of electric power," Strong says. "We need to push, nationwide, for that democratization, to allow everyone access to solar power.

Thanks to the people of Harvard for their pioneering determination.

30% Federal Tax Credit Set to Expire!

By GET staff

The federal solar Investment Tax Credit (ITC) will expire at the end of next year. We must emphasize strongly one thing about this. The fact that there are about sixteen months left before it expires does not mean that there is any time to delay on getting an installation. Anyone who wants to take advantage of the solar ITC really must act right now.

The solar ITC is a reduction in taxes for anyone who installs solar photostatic systems or certain other kinds of solar collectors. The reduction is equal to 30% of eligible solar installation costs, up to the amount owed in taxes. This means that installation of a $10,000 system can reduce taxes by $3,000, for anyone who would owe taxes of that much or more.

It is very important to note, however, that the system must be installed and operating by the end of next year. Some of the solar installers in the Northeast are already booked for installations into next year, and any appreciable delay signing up for a system could make it impossible to get it installed in time to take advantage of the ITC.

Some people would really like to install a solar system, but cannot take advantage of the ITC. There are solutions to that problem. The system can be paid for by an investor who gets the credit, and then transferred, at a specified time, to the person using the power. Peter Thurrell, who heads up Soveren Solar, in Putney, Vermont, explains, "We can give a discount of a dollar per watt from the cost. This is possible because Soveren Solar takes the tax credit." The customer leases the panels, and at the end of the lease period, the company gifts them to the customer. Other solar installers or investors may have similar programs.

Another important point is that the ITC can be renewed by congress. There is some mounting pressure not to renew them, given declining costs of solar power and the political disposition of congress.

Please remember that climate change is not slowing down. If we do not make a switch away from fossil fuels, we will have greater problems. Please support those in congress who support renewable power and energy efficiency.

Three NH Communities Rank on Top for Residential Solar

Green Energy TImes Staff

Jonathan S. Osgood, the Energy Conservation Coordinator for the New Hampshire Public Utilities Commission (NHPUC), passed this up-to-date information along to us, which had previously been gathered by Sarah Simonds of Vital Communities. Sarah's information was based on data from a May 2015 NHPUC report on the commission's residential solar rebate program.

So far, the New Hampshire communities with the greatest numbers of approved applications for installed systems, as of July 20, 2015, are:

1. Lyme, 58 rebate applications, tied with
1. Hanover, 58 rebate applications
3. Sandwich, 47 rebate applications

The top-ranking figures per capita, however, are a bit different:

1. Randolph, 1 photovoltaic (PV) system per 24 residents (only 13 systems)
2. Lyme, 1 PV system per 30 residents
3. Sandwich, 1 PV system per 36 residents

At the time of our communication with Mr. Osgood, he pointed out that he had not yet been able to insert all of the town populations in his database, so consequently he could not definitively rank these towns against the whole state's status. These numbers reflect only those systems that they have approved for rebates. Many have yet to be completed or at least reported as complete to the NHPUC.

Jonathan Osgood can be reached at Jon.Osgood@puc.nh.gov or (603) 271-6306. Sarah Simonds can be reached at sarah@vitalcommunities.org or (802) 291-9100, ext. 109.

NH SOLAR GARDEN

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everything will be completed by spring.

NHSolarGarden.com will not do the physical installation of the projects. That is done by existing solar installers with known credentials. NHSolarGarden.com is an organizer, which passes the work it has seen through permitting on to cther companies. It is providing the important service of doing the background work and making sure that installations will get done that might otherwise be delayed for a long while.

One community solar garden stands out as a shining example what what a town can do. At the beginning of 2015, New Hampshire had about 7 MW of solar capacity installed. Now, the city of Franklin, with a population of 8,400, is building a 10 MW community solar garden. This one town, and not a wealthy one at that, will have a good deal more solar capacity at the end of 2016 than the entire state had at the beginning of 2015.

What Franklin will get from its solar garden is worth considering. The town will see $100,000 per year in benefits from land that will be producing income. The people in the town will see the benefits that develop from their investment in the solar garden, including lower power bills. That is the sort of thing that can make quite a difference.

The state chose to cap net-metered renewables at 50 MW, but not all for solar. Adding to solar already installed, 29 MW more will reach the cap. NHSolarGarden.com has lined up 25 MW for installation, which will bring the state's solar capacity to about 450% of what it currently is within about ten months. This will very close to meeting the cap on its own. The remaining 4 MW will very likely be taken up by other organizations with other installations, so it is likely that New Hampshire will end 2016 with nearly five times the 7 MW of solar capacity it had in the beginning of 2015.

A lot of communities could see a benefit similar to Franklin's, but they only will if the solar cap is raised. This means the legislature will have to act on the cap.

Increasing the cap also means the utilities will have to be ready to deal with increased amounts of solar power. This is not always as hard as it is made out to be, because solar power is most abundant at the same time of day when electric demand is highest, and it can be consumed locally, often reducing the need for transmission lines. Nevertheless, some utilities doubtless resist it.

Andrew Keller is currently working on fine-tuning an understanding of what is needed to move things forward. He says one of the most important things is getting the word out.

NHSolarGarden.com's web site is nhsolargarden.com.

SOLARIZE Dummerston UPDATE

By Stan Howe, Solarize Dummerston

Solarize Dummerston is a volunteer-run, grassroots cooperative group purchase program based upon the Solarize process that has been so successful across the country. It is open to residents and businesses from Dummerston, Vermont and surrounding towns.

To simplify the process of going solar, the Solarize Dummerston volunteers have selected three installers from the proposals we received. For community solar we selected Soveren Solar. For rooftop and fixed-ground-mount systems we selected Integrated Solar Applications. For solar trackers we selected Solaflect.

Each installer is offering a tiered pricing program where the price per watt decreases as they sell more solar within our program. The more people who buy a system, the cheaper it gets for everyone.

We currently have about 110 people who have signed up for the free site assessment. Over 100 individual proposals have been delivered to customers with more than 40KW currently under contract.

There will be a "Solar 101" event at the Dummerston Grange on August 27th with presentations on the financing and tax incentives available. Our installers will be on hand to answer questions. Snacks and drinks will be provided.

The deadline to sign a contract is September 30th. For more information or to sign up for a free site assessment visit solarize.dummerston.com.

Battery Maintenance

for your renewable energy storage system

Solving the Achilles Heel of Battery Storage

By Luke Simmons

Going "off the grid" and using the sun or wind for electricity can be a liberating achievement – gaining independence from utility companies, reducing dependence on fossil fuels, and taking a giant step towards a sustainable lifestyle. The heart of a typical off-grid system is a set of flooded deep-cycle batteries, which require periodic refills of distilled water. But, relying on store-bought water in plastic containers is hardly sustainable, and some are finding distilled water shortages at their local grocers.

"This one issue could easily turn into the systems' Achilles Heel if a situation arose where we couldn't get to a store so we could buy distilled water," said Tammy Reiss, who lives off-grid and uses around a gallon and a half of distilled water per week in her household's nickel-iron battery bank. "I also cringe having to buy all those unsustainable plastic jugs that the distilled water comes in."

Tammy and her husband Matt say becoming more self-reliant is what sold them on an off-grid solar powered battery storage system in the first place. Their battery bank consists of 20 Iron Edison nickel-iron cells; each cell is 1.2 volts and 300 amp-hours. The cells are wired in series to make a nominal 24 volt, 300 amp-hour battery bank. The individual cells are in a clear casing with minimum and maximum water level lines marked, so it's easy to see when water needs to be added.

As a flooded battery recharges, electrical energy is converted to chemical energy and water in the electrolyte evaporates. Watering is typically required every four to six weeks, but in hot summer months when solar exposure is the highest, watering can be required every week. Both lead-acid and nickel-iron chemistries require these periodic distilled water refills.

Matt and Tammy say they grew tired of going store-to-store looking for distilled water and began researching home water distillers. They eventually settled on a one-gallon capacity model from American Water Distillers for under $100. The unit has a total draw of 720 watts and is rated to make a gallon of distilled water in four hours.

"We found putting it in a cool area, like our basement, cuts this time by a half hour," said Tammy. Water vapor condenses more easily on a cool surface.

The Reiss's used to pay $1.29 per gallon of distilled water in upstate New York. Now, the water costs nothing and is distilled by excess energy from their solar array. Matt usually distills twice a week, on sunny days when his solar panels are producing excess energy.

"What's great is the whole system is fully sustainable now," Matt said. "I don't have to worry about getting to a store; I can make my own [distilled water]."

A nickel iron battery bank. Minimum and maximum water lines are marked on each cell to indicate when watering is needed. Photo courtesy of Iron Edison.

For those looking to distill their water at home, Matt advises that higher wattage does not necessarily indicate a more efficient distiller. Further, stainless steel models are recommended, as impurities from plastic could seep into the water and damage a battery.

While some may attempt to make their own homemade distilled water, using coffee makers or self-constructed units, the end product may not be suitable for batteries. Most such equipment does not actually distill the water. The minerals and ions found in tap water can harm the metal plates inside a battery and reduce its capacity and longevity.

"There are a lot of do-it-yourself instructions on the web on how to build or acquire distilled water," Tammy explained. "If you can't guarantee 100% pure distilled water as the end result, do not use the end product in your batteries."

Using sealed lead-acid batteries, which don't require any watering maintenance, is another option for off-grid systems. But they don't last nearly as long as their flooded counterparts, and contain lead which is difficult to recycle and toxic to the environment.

The Reiss's nickel-iron battery bank is rated for at least 30 years of service. It is fully recyclable and environmentally friendly, containing no toxic elements.

Luke Simmons is a system designer and sales manager at Iron Edison Battery Company. He is NABCEP-certified in PV Technical Sales and specializes in both grid-tied and off-grid renewable energy systems. He can be reached at (720) 432-6433 or luke@ironedison.com.

DISTILLING WATER

By George Harvey

There are many reasons to want to be able to distill water in the home. Having a supply of water for batteries is only one. Other reasons range from having water for ironing clothes to ensuring a supply of safe drinking water for emergencies.

The principle of water distillation is easy. Any water that condenses on any surface will be free of most impurities. This includes frost on a window (a sure indication that the window needs attention) and condensation on a cold glass. Rain water is atmospheric condensation and is usually relatively pure. The problem with these sources is that they are unprotected from airborne contaminants.

When the source of the water vapor and place where the water condenses on are enclosed, we can be sure that any dust and nearly all chemicals will be eliminated. This is why distilled water is nearly pure.

Water need not be boiled to be distilled. It can actually be distilled at room temperature, if the surface on which the vapor condenses is colder. Ground water will condense on a surface cooled by the night air, and that, in fact, is much of what we see as dew or frost. So gentle heat from the sun is enough to produce distilled water.

BRADFORD, BRADFORD, BRADFORD SOLAR

By Nancy Rae Mallery

Bradford, Vermont is a small town in the Cohase Valley, located in east central part of the state. Situated in a *wide valley (the meaning of Cohase)* along the Connecticut River, this community of 2,797 people is taking big steps toward energy independence. Solar systems are springing up all over the town this summer, more than ever!

In October 2009, groSolar installed a 9.6kW solar system on the roof of North Country Organics on Depot Street, meeting 100% of their needs. That was not the first, but now there are many more.

BRADFORD PUBLIC LIBRARY

In 1796, Bradford became the first town in Vermont with a chartered library. The Woods Library Building stands at the intersection of US Route 5 and South Main Street, at the center of the south end of the business district. It was designed by Lambert Packard of St. Johnsbury, in his adaptation of the Richardsonian Romanesque style, and finished in 1895.

According to Bud Haas, the library treasurer, this beautiful building has had significant energy improvements and is now powered 100% from the sun, thanks to a program offered by Green Mountain Community Solar (GMCS), as an off-taker. GMCS retained 20% of the panels in a system they installed, and the credits for these panels are applied to accounts of off-takers, which get credits on their electric bills. The library pays GMCS 90% of the standard rate and will be saving $150 yearly, at no expense.

Bruce Genereaux, the owner of GMCS, explained that two "corporate partners" get discounts on their electricity by participating in solar farms. Bradford's library gets credits from 6kW of solar panels. The other, Little Rivers Health Care, gets credits from 20kW. Neither organization was required to put up any money. The actual panels are part of the 140kW Eddy Road Community Solar Farm, with 780 panels in Chester, Vermont. It went online on July 14, 2015.

Green Mountain Community Solar

Since 1983, Farmway has been a landmark destination., as a family-owned and operated store with over 4 million dollars in inventory. They carry farm and pet supplies, as well as footwear, clothing, sporting goods and gear.

FARM-WAY

Farm-Way is now 100% solar-powered. The all-purpose general store ("Complete Outfitters for Man and Beast") had groSolar install a 55kW system in 2008 and had been getting 43% of their electricity from it, but that has been expanded. Skip Metayer, VP of Farm-Way told us, "With the additional 77kW, which went on line July 27, 2015, we are now producing 100% of our electricity needs, with enough extra to support a 19,000 square foot addition we are in the middle of adding as well. It will be complete in October 2015."

Catamount Solar installed the new system. Metayer said, "Two of the owners were with groSolar when groSolar installed my original system. We have used Catamount since the disappearance of groSolar." Metayer also told us they make energy-efficiency improvements every time they replace antiquated fixtures. The results are significant, especially with some of the old high-bay inside lighting and exterior yard lights; now they are all LEDs, saving hundreds of watts per fixture.

Farmway 100% Solar by Catamount Solar

BRADFORD COMMUNITY SOLAR FARM

The summer of 2015 also saw the addition of the new Bradford Community Solar Farm. The Saladinos farm on Lake Morey Road has a new "cash crop" on a single acre, with the installation of a 150kW solar system by SunCommon. It will supply power for 28 homes. SunCommon has directed the utility to apportion a share of the array's output to each Community Solar customer's power bill. The credits can zero out the utility bill, so the Community Solar members shift their power payments to the solar array – at a 7% discount from the standard utility rate.

Bradford Community Solar by SunCommon

O'Meara Solar

AND MORE SOLAR: Catamount Solar has installed at least 29kW of solar on residential homes and the elementary school.

GMCS accounts for 6.3kW at the Chester solar farm, with $1,400 expected annual savings.

O'Meara Solar installed a 10.26kW system at a small farm in Bradford. It has 36 SolarWorld modules, two SMA inverters, a Midnite Solar rapid shutdown system, and a secure power supply outlet for up to 1500W of solar power when the grid is down.

SunCommon has installed solar on five residences for a total of 35kW.

Real Goods Solar has installed solar at three homes, which should offset more than 478 tons of CO2 over 25 years.

Finally, we want to mention that Bradford is the home of *Green Energy Times*, which has been 100% solar powered for 15 years. We are proud to be part of a great town that is preparing for a sustainable, energy independent future.

$1.1 Million for Anaerobic Digestion Facilities

Massachusetts Clean Energy Center (MassCEC) CEO Alicia Barton has awarded $1.1 million in funding for three projects across Massachusetts that will convert organic materials into energy.

"Supporting the adoption of clean energy projects across the state means we're helping organizations and businesses cut energy costs and protect our environment by generating local sources of energy," said Energy and Environmental Affairs Secretary Matthew Beaton. "We hope these projects inspire other organizations to make the switch to clean energy."

Each award will support the development of anaerobic digestion facilities in the communities of Bourne, Freetown and Hadley.

Anaerobic digestion is a process that converts a variety of organic material – that would otherwise be considered waste – into electricity and heat. It is a biological process by which microorganisms break down organic materials, like food or animal waste, to form a methane-rich gas. This gas is then used to run an electric generator or generate heat. The remaining "digested" material is rich in nutrients and can be used as a fertilizer or soil additive.

The three projects will use these materials as a fuel to generate energy and heat. MassCEC is funding these projects to help three organizations operate systems that reduce waste, cut energy use and generate energy locally.

"By transforming waste into energy, these projects will cut energy use while creating home-grown sources of renewable energy," said Barton. "We're proud to collaborate with these private partners to secure a clean energy future for Massachusetts."

The funding comes from the Renewable Energy Trust, which was created by the Massachusetts Legislature in 1998 as part of the deregulation of the electric utility market. The trust is funded by a systems-benefit charge paid by electric customers of investor-owned utilities in Massachusetts, such as Eversource or National Grid, as well as municipal electric departments that have opted to participate in the program. The average monthly charge is 32¢ for an average residential ratepayer.

There are 13 anaerobic digestion systems installed across Massachusetts that generate the equivalent to the annual electricity consumption and heat generation equivalent of approximately 4,500 and 9,500 households, respectively.

MassCEC awarded three grants to the developers of the following projects.

Harvest Power (Bourne) - $400,000. Developers will design and build an anaerobic digester to process wastewater treatment sludge, food waste, fats, oils and grease. The system will combine biogas from the digester with gas from Bourne's adjacent landfill to provide electricity to the grid.

Stop & Shop (Freetown) - $400,000. S&S Freetown, LLC will construct a digester located at Stop & Shop's distribution center. The facility will process unsold food from Stop & Shop's regional stores to generate electricity and heat, supplying about 32% of the distribution center's electricity needs.

BGreen Energy, Barstow's Longview Farm (Hadley) - $309,716. BGreen Energy will upgrade its current 300-kilowatt anaerobic digestion system at Barstow's Longview Farm, adding a second 500-kW generator, in-ground receiving tank and other equipment. These upgrades will increase electricity production at the farm by about 108%, as well as increase heat production. The existing digester produces liquid fertilizer, animal bedding and hot water for use on the farm.

"Harvest Power is excited about the potential to bring a new clean energy project to the town of Bourne," said Kathleen Ligocki, CEO of Harvest Power. "In the spirit of true public-private partnerships, the grant from MassCEC helps attract private capital to commercialize innovative clean technologies and bring them to Massachusetts communities."

"We are thrilled that Massachusetts Clean Energy Center is partnering with us on our journey to reach zero waste by 2020," said Mark McGowan, president of Stop & Shop New England Division."Our Freetown anaerobic digester is one example of the many ways we operate our business in a socially and environmentally responsible way, giving us energy to run our Freetown Distribution Center that services all of our Stop & Shop New England stores."

"The continued support of MassCEC has allowed us to continue to show the nation how to maximize the effectiveness of renewable energy on our dairy farms using materials from waste, which become electricity and fertilizer," said Bill Jorgeson, managing partner of BGreen Energy. "We sustain our farms, create jobs and have 24/7 available power capacity for the Commonwealth."

MassCEC is dedicated to accelerating the success of clean energy technologies, companies and projects in Massachusetts while creating high-quality jobs and long-term economic growth for the people of the commonwealth. Learn more at www.MassCEC.com or view their photos at www.flickr.com/photos/masscec.

MASSACHUSETTS CLEAN ENERGY CENTER

Community Solar is Now Accessible To Millions of New Yorkers

By Wyldon King Fishman

If you live or work in New York, a shady location can mean summertime temperatures are a little cooler around your home or business. Shade is a wonderful thing, even if it's only an awning. But as you know, you can't use solar modules without sun. Even a little shade may make rebates unattainable, but there still may be a way to get what you want. Welcome to community solar!

Low-income renters, occupants of multifamily buildings, people without good solar sites, schools, municipal governments, and commercial customers can now band together and finance a solar system nearby in a field or on a big, sunny warehouse rooftop. How? First, find ten or more ratepayers and a leader to supervise the project, who all are located fairly close together. Everyone shares a piece of the system pie. Every month, the members' utility bills reflect the net- metering credit of their own portions of the system.

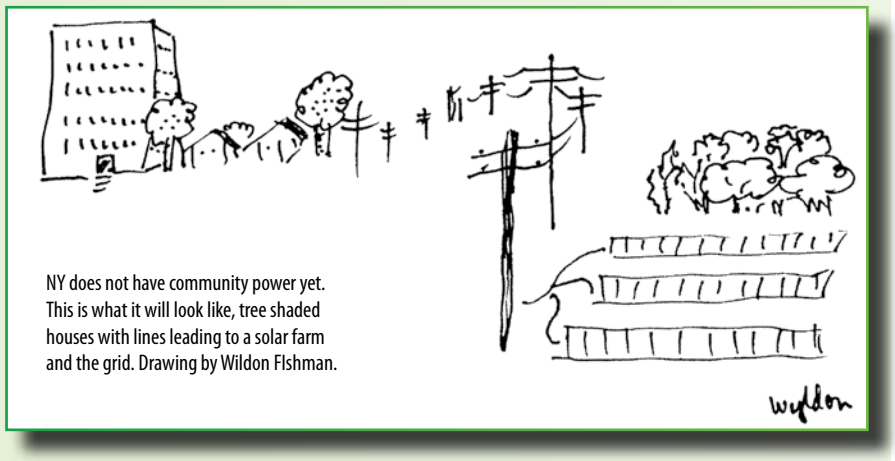
Not keen to handle the job? Contact solar installation consultants and contractors. Listening to the professionals will help your group understand the financing, locations, and utility hook-ups for access to transmission lines. They'll educate you and then may come out and bid on your project. You'll have decisions to make about land acquisition, site surveys, engineering studies and fees to pay for permits.

Local solar, wind and some other renewable energy projects qualify. It is worth doing a little research to see if a particular available resource could be developed under the program.

Details

The first phase begins October 19, 2015. It is limited to benefitting low-income customers with high demand for power that's not easily met by the current utility grid. It supports economically distressed communities by ensuring at least 20% of the participants are low- and moderate-income customers.

The second phase starts on May 1, 2016. All can participate in all utility territories.



NY does not have community power yet. This is what it will look like, tree shaded houses with lines leading to a solar farm and the grid. Drawing by Wildon FIshman.

Background

Colorado was the first state to allow what were then called solar gardens. They were limited by caps, which were filled to capacity almost overnight. The utilities complained about transmission line usage, but over time some began so see the advantage of Solar Gardens where the electric load was very high and the service was not dependable.

The New York Solar Energy Society got a call from the staff in the Budget and Taxation Department asking why community solar gardens weren't being developed in New York. Our response was that it had a lot to do with large properties getting service from different utilities. A barn on the other side of the road often got electricity from one utility while the house was supplied by another. A camp might have a sunny field suitable for a solar garden next to a pole, but the utility that owned the pole didn't service the main kitchen. Different utilities didn't have to cooperate, share transmission lines and take care of the extra billing.

cont'd on p. 18

Solar is Booming in New York

GET staff article

In June, New York Governor Cuomo announced that solar capacity in his state had grown 300% from 2011 to 2014. That is double the average rate in the United States. The capacity at the end of December 2014 was 314.48 megawatts (MW), enough to power about 51,000 households in the state. New York City had the largest capacity increase of any area of the state, at 548%.

Growth of solar power is not about to slow down any time soon in New York. The amount of capacity under contract in May was 304 MW, with another 65.6 MW approved but not yet contracted.

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 development 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 Small Scale RE Incentive Program, administered by Renewable Energy Resource Center (RERC), provides funds to help defray the costs of new solar thermal and advanced wood pellet heating systems.

SOLAR INCENTIVES – BASED ON RATED CAPACITY OF SYSTEM

- http://www.dsireusa.org/incentives

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

Pellet Heating

- advanced wood pellet heating systems -- $2500 per boiler (+$500 if an audit is completed and +$500 if the system includes at least 20 days' worth of pellet storage).
- **Details at 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 $2,600 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 Dryers - $50 to $400 rebate on select ENERGY STAR models

Heating/Cooling

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

Residential New Construction

- enroll in Residential New Construction Service – up to $2,000 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 – up to $400 rebate on qualifying ENERGY STAR models
- 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.

Category 1:

- Less than or equal to 100 kW AC.
- New Solar PV = $0.75/Watt AC or 25% of total project cost, whichever is less.
- Expanded Solar PV = $0.50/Watt AC or 25% of total project cost, whichever is less.
- New Thermal (total size of less than or equal to 15 collectors) = $0.12/rated or modeled thousand Btu/year or 25% of total cost, whichever is less.
- New Thermal (total size of greater than 15 collectors) = $0.07/rated or modeled thousand Btu/year or 25% of total cost, whichever is less.
- Expanded Thermal = $0.04/rated or modeled thousand-Btu per year or 25% of total cost, whichever is less.
- Maximum incentive in combination with other incentives received: Rebate in combination with other rebates or grants received from the utility or other programs, including other state, local or federal programs, shall not exceed 40% of the total cost of the system (Does not include federal tas credits).

Category 2:

- Maximum 500 kW AC and greater than 100 kW AC.
- New Solar PV = $0.65/Watt AC or 25% of total project cost, whichever is less.
- Expanded Solar PV = $0.30/Watt AC or 25% of total project cost, whichever is less.
- Maximum incentive in combination with other incentives received: Rebate in combination with other rebates or grants received from the utility or other programs, including other state, local or federal programs, shall not exceed 40% of the total cost of the system (Does not include federal tas credits).

Contact Elizabeth.Nixon@puc.nh.gov

PLEASE NOTE: Changes are anticipated for the solar PV residential program and the solar C&I program. For Info contact executivedirector@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

- Rebates for solar electric/thermal projects 100kW (or thermal equivalent) or less
- New Solar PV = $0.75/Watt AC or 25% of total project cost, whichever is less.
- Expanded Solar PV = $0.50/Watt AC or 25% of total project cost, whichever is less.
- Solar thermal = $0.12/kBtu for systems of 15 collectors or fewer ($0.12/kBtu for systems of greater than 15 collectors) or 25% of total project cost, whichever is less.
- Expanded Solar Thermal = $0.040/kBtu/yr or 25% of total project cost, whichever is less.
- Maximum incentive in combination with other incentives received: Rebate in combination with other rebates or grants received from the utility or other programs, including other state, local or federal programs, shall not exceed 40% of the total cost of the system (Does not include federal tas credits).

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

PLEASE Check for UPDATEs With NHEC.

Commercial Solar Thermal (Hot Water)

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

Commercial Solar PV

1. $0.50 per watt up to the lesser of 15% of installed cost or $20,000

Commercial Fossil Fuel Program

2. Incentives of 35% up to $15,000

Residential Solar PV

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

While we at Green Energy Times try to keep things up to date, incentives are always changing. Be sure to check with the appropriate sources for the latest information.

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

WWW. NHEC.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, & 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), Eversource 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.

ENERGY 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 W. 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.**

MASSACHUSETTS SOLAR LOAN PROGRAM

Mass Solar Loan focuses on connecting homeowners who install solar electric systems with low-interest loans to help finance the projects.

The $30 million program, a partnership between the Massachusetts Department of Energy Resources (DOER) and MassCEC, will work with local banks and credit unions to provide financing to homeowners interested in solar electricity. DOER's program design will work with banks and credit unions to expand borrowing options through lower interest rate loans and encourage loans for homeowners with lower income or lower credit scores.

Since 2008, the solar electric industry in Massachusetts has grown into a robust economic sector with over 1,400 businesses and 12,000 workers, with enough solar electricity installed in the Commonwealth to power more than 100,000 homes.

Mass Solar Loan will continue to grow this sector, while allowing more homeowners the ability to achieve the cost savings and environmental benefits of this clean, renewable energy source. **www.masscec.com/programs/mass-solar-loan**

DEPT 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 MA SREC POLICY

Massachusetts' new version of its Solar Renewable Energy Credits Program is informally being called SREC II.

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.

More information can be found at: http://bit.ly/Mass_SREC_II

NEW YORK

RENEWABLE ENERGY INCENTIVES OFFERED THROUGH nyserda

New York State Energy Research and Development Authority.

- Business & Industry
- Communities & Governments
- Partners & Investors
- Cleantech & Innovation
- Residents& Homeowners

DISCOVER YOUR HOME'S ENERGY WASTE

Getting a home energy assessment can help you take control of your energy costs. It can identify where your house is using the most energy and which improvements would have the biggest impact on your bottom line. Heating and cooling costs frequently account for 50% of residential energy bills. Identifying your energy waste can lead to big savings.

Visit: nyserda.energysavvy.com to get an energy assessment

RENEWABLE ENERGY INCENTIVES OFFERED THROUGH NY-SUN

http://ny-sun.ny.gov/

NY-Sun is structured around customized Megawatt (MW) Blocks targeted to specific regions of the state. To learn more, see the Megawatt Block Incentive Structure.

Residential and Small Business

http://ny-sun.ny.gov/Get-Solar/Residents-And-Small-Business

Commercial and Industrial

- http://ny-sun.ny.gov/Get-Solar/Commercial-and-Industrial

Community Solar

- http://ny-sun.ny.gov/Get-Solar/Community-Solar

Find a Commercial/Industrial Solar Installer

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- http://ny-sun.ny.gov/Get-Solar/Find-A-Solar-Electric-Installer

Financing Options

- http://ny-sun.ny.gov/Get-Solar/NY-Sun-Financing

Clean Power Estimator

- http://ny-sun.ny.gov/Get-Solar/Clean-Power-Estimator

NY-Sun is structured around customized Megawatt (MW) Blocks targeted to specific regions of the state. To learn more, see the Megawatt Block Incentive Structure.

The Megawatt (MW) Block Dashboard provides real time information on the status of block and current incentive levels by sector and region. Block status is updated as applications are submitted, so click the refresh button to see the current status.

https://www.powerclerk.com/nysuninitiative/dashboard.aspx

Hydro Upgrades In Proctor, VT

DOUBLE THE HYDRO GENERATION CAPACITY

Project adds significant low cost, renewable energy for Vermonters

Green Mountain Power recently completed an improvement project to its 110-year-old hydro plant on the Otter Creek in Proctor that will mean more renewable, low-cost hydro power for GMP customers. The added capacity makes this plant the largest of Green Mountain Power's fleet of 32 Vermont hydro plants.

"Our Vermont hydro plants are the lowest cost source of electricity in our energy mix and we are pleased to be able to deliver on our promise of more renewable energy for customers," said Mary Powell, President and CEO of Green Mountain Power. "Our customers and the environment benefit when we can produce this kind of clean, local and low cost power. This hydro expansion ties into our vision as Vermont's energy company of the future as we transform the 100-year-old grid of the past to one where more power is generated closer to home and Vermonters are using innovative products and services to be more comfortable, save money and use less energy."

Hydro is a major part of GMP's energy portfolio with 42% of the power GMP customers receive coming from renewable hydroelectricity.

The plant, formerly owned by Vermont Marble, needed significant repairs when it was acquired by GMP in August 2011. Four of the five turbines were not functional, so GMP completely replaced three turbines and rebuilt another. The four turbines are now at modern levels of efficiency, meaning that they were in the range of 92.4% to 93.4% efficient, much improved from early 20th century technology. Though GMP has no records of what the efficiency once was, it was very likely in the range of 80% to 85% for the older turbines.

With the renovations, the plant now has 10 megawatts of generating capacity and is expected to produce an estimated 38 million kilowatt-hours (kWh) a year, compared to the 19 million kWh it recently generated prior to the upgrade. That's enough to energy to power about 5,300 homes.

Upgrades doubled the hydro generation capacity at the Otter Creek Hydro Plant in Proctor, Vermont. Photo courtesy of Dotty Schnure (GMP).

The renovation began in 2012 with construction of a bridge to access the hydro plant. The only access had been a walkway via a series of ramps and stairs to the station for personnel and an old rail-lift system on the hill between the plant and the Marble Museum. The $15 million redevelopment project employed local, regional and specialty contractors, creating economic benefit to the region throughout construction. GMP took great care to protect the historic marble powerhouse structure, which was built in 1905.

"We are really pleased with the work GMP did to upgrade the historic Proctor hydro plant and thank them for their commitment to our town and to preserving this important local asset," said Bill Champine, chair of the Proctor Selectboard. "It is a big improvement that will benefit the town as well as GMP customers and we look forward to the added improvements to recreation areas that will be done in 2016. This will help the town's prosperity plan that we have been working on for more than a year."

More information can be found and is available at greenmountainpower.com.

Community Solar in NY

cont'd from p. 15

Soon we shall see if progress has been made. The details have not been finalized, but the utilities have been lobbying to keep community solar from crossing utility territories.

In six years of working with the energy committees of the legislature we never got the bill we needed. Over the past year, however, Governor Andrew Cuomo has been pushing through the Shared Renewable Initiative or Community Net Metering as part of his Reforming the Energy Vision Initiative. This is a surprise win-win for all New Yorkers seeking clean, affordable energy.

Local energy production can withstand storms better with shorter transmission lines. Also, long distance transmission lines lose 8% to 18% of the electricity generated at the power plant, but with local power generation much better efficiency can be achieved. Now we can eliminate the cost of extraction and transportation of fuel and maintaining expensive transmission lines and benefit from lower costs and healthful clean air and water.

Equal access to renewable energy has come to New York. The state's Public Service Commission voted and has issued a final order telling the utilities the time has come to allow any group to buy a solar-energy-generation system, hook it up to the grid and credit the members of the group every month. The future is bright for locals to design and implement a grid for your community.

Along with the Community Solar news we received the announcement of more than eighty "microgrid" research-grants winners. A community solar farm can be joined by wind and combined with battery backup for uninterruptable power supply.

Stay tuned. In the meantime prepare to find a group interested in free fuel from the sun and wind powering your community.

For more information, please visit www.ny-sun.ny.gov/community-solar.

Wyldon King Fishman hails from The Bronx where she founded the NY Solar Energy Society (www.nyses.org) to help educate children and families about renewable energy and energy conservation. She recently weatherized her old house and can't believe the difference.

Garbage Patches in our oceans

By George Harvey

We do not have space here to describe why the Coriolis effect works as it does, but we can note that it is the reason why cyclonic storms have clockwise rotation in the northern hemisphere and counterclockwise in the southern, and high-pressure areas move in the opposite direction to low-pressure areas.

The waters in the ocean behave the same way. The effect of this is that there are areas in the oceans, called "gyres," which are large eddies. They are numerous, but five are especially large. One, the North Atlantic Gyre, also called the Sargasso Sea, has been known to us since at least the time of Columbus. The other large gyres are in the North Pacific, the South Atlantic, the South Pacific, and the Indian Oceans. All rotate as low-pressure areas, as the water gradually flows toward the middle, and then down to the ocean floor.

Anything floating in the water of a gyre is likely to move toward its center, unless it is blown about by the wind. This means that the gyres collect anything that floats in the water. Particles of plastic and other debris, much of which is so small it cannot be seen without careful examination, float in greater concentrations as they approach the center of the gyres.

The existence of debris fields in the centers of the gyres was only predicted in 1988 by scientists at the National Oceanic and Atmospheric Administration. They were confirmed less than ten years later.

The waste areas, called the North Atlantic Garbage Patch and the North Pacific Garbage Patch, are many hundreds of miles across. The particles in them are mostly very small. Nevertheless, they are dangerous to wildlife.

Plastic particles often contain long-term poisons. The finest of them are ingested by microplankton, which concentrate them in their digestive systems. These are eaten along with slightly larger plastic particles by larger plankton andsmall fish. These, in turn, are eaten by larger and larger animals until the plastics and their poisons are concentrated in the largest animals. At each stage, larger pieces of plastic are added to the mix.

Seabirds supply fish to their young, providing them with a toxic brew of plastics and poisons. Many are killed. Current estimates are that Midway Island has about twenty tons of plastics wash up on its beaches each year, and about a quarter of these are eaten by albatross and other ocean birds. About a third of the young die, and many of them are victims of the waste floating in the ocean.

cont'd on p.28

Energy Recovery Ventilation

By George Harvey

Sometimes it seems builders and architects have settled into a chorus, all chanting the same thing. Whether the current verse is about LEED Platinum buildings, achieving zero net energy or better, or passive house standards, the chorus seems to be, "Plug every little air leak."

While it is certainly true that air infiltration can ruin a building's efficiency, it is equally true that poor ventilation produces stale air, with reduced oxygen levels and high levels of humidity, carbon dioxide, and other pollutants. Good balanced ventilation requires that fresh air be brought into a building from outside, and stale air from inside the building be expelled.

One set of building regulations we know of requires air equal to half a home's volume be changed every hour. In a 1,500-square-foot home, this might be about 1.7 cubic feet per second. It seems hard to imagine that so much air could pass through a building without having negative effects on its heating efficiency.

An obvious solution to this problem is to use the heat of the stale air being expelled from the building to warm up fresh air coming in. The simplest systems that do this are called heat recovery ventilators (HRVs).

To picture how this works, imagine an HRV built by putting a long piece of four-inch stovepipe inside an equally long piece of six-inch stovepipe. There is no insulation between the two, but the whole is insulated on the outside. Cold, fresh air will come into a house through one pipe, and warm, stale air will go out through the other. Fans are rigged to force air movement. The cold incoming air is heated by the warm outgoing air, and efficiencies in such a rig can be surprisingly high, if the pipes are long enough.

There are problems with all such overly simple HRVs. One is that they do not address issues of humidity. Water in the moisture-laden warm air will condense as it cools in the HRV, and this needs to be dealt with or the unit may leak or corrode, leading to contamination of incoming air and possibly increased humidity in the home. These conditions can provide for growth of bacteria and mold, leading to issues ranging from health problems to structural damage of the building.

The good news is that more carefully engineered systems are available. These are the energy recovery ventilators (ERVs) such as those offered by RenewAire. Readers may remember an article on RenewAire in our June issue, in which we took a look at the company's environmentally conscious approaches to manufacturing.

An ERV is a system that not only recovers heat that would otherwise be lost, but also addresses issues of humidity. In the winter, the humidity of outgoing air is passed to what is drier, colder air coming in just as the heat is. In the summer, the operation goes in the opposite direction, with incoming humidity being captured in the drier air going out. Any pollutants that would otherwise build up in the inside air are moved outside at the same time. This all can happen without any chemicals or moving parts, aside from the fans used to move the air, if a good unit is chosen.

The result of all these things is that it is now possible to have a building that is highly energy efficient and also has very healthy air. Homes can have the even temperatures of highly efficient buildings, and at the same time they can be free of the health issues relating to restricted ventilation.

There is a set of links to videos showing how an ERV works, the advantages of an ERV system, and other interesting topics at the home page of RenewAire's website, www.renewaire.com.

* *Above: RenewAire Energy Recovery Ventilator. Image courtesy of RenewAire.*

FINANCING WOOD HEAT PROJECTS IN NH

Fund Established to Help Finance Advanced Wood Heating Projects in New Hampshire

The U.S. Endowment for Forestry and Communities, USDA Forest Service and New Hampshire-based Innovative Natural Resource Solutions LLC have announced the establishment of the New Hampshire T-RECs Enterprise Fund to provide capital financing for community-scale wood heating projects. (T-RECs are "thermal renewable energy certificates." - ed.)

The fund has an initial $750,000 investment and will build on New Hampshire's first-in-the-nation Renewable Portfolio Standard wood biomass heating incentives.

Read more at www.t-recsfund.org.

NH SPCA ENERGY UPGRADES
Three Years Later – How They Fared

By George Harvey

Photo courtesy of ReVision Energy

The New Hampshire Society for the Prevention of Cruelty to Animals (NHSPCA) had some very unusual energy problems at its shelter in Stratham, NH. These were addressed during the time from about 2008 to 2012. We can now look at the results.

The NHSPCA takes in all manner of animals – not just dogs and cats, but everything from gerbils to horses. There are many of them, about 3,000 per year, looking for new homes. To be a healthy place for these animals, everything has to be clean, and that means a lot of washing. So the shelter was using 1,600 gallons of very hot water, every day.

The old oil-burning boilers that provided heat and kept the water hot ran all the time, even in the summer. The financial burden was high, at $55,000 for fuel in 2009 to 2010. It should be needless to say, the environmental impact was also high. In addition to hot water, there were other reasons to upgrade the center's energy profile. Replacing the system for heating water would naturally have an effect on the buildings' heating systems, and this had to be reviewed. There were, of course, other energy-related issues to consider.

The start for almost any such program is to look at what support is available from the community and government. As the NHSPCA took its first small steps on lighting and heating controls in 2009, they discovered some of these avenues. They got help from the Community Loan Fund and the Office of Energy and Planning, and found that stimulus money was available, giving them access to loans and grants.

The Jordan Institute, located in Concord, provided an energy audit covering the energy needs. With the report of its findings, the NHSPCA was able to prioritize its efforts. This became an effort with three main elements.

A solar thermal system was installed by ReVision Energy of Exeter, NH. Forty Wagner C20 solar hot water plate collectors were placed on the Adoption Center's two south-facing roofs. These provide heat for a custom-built 1,600-gallon solar hot water storage tank. The daily hot water needs of the center are met by this system. It also supplies some heat for the center when it has a surplus.

The switch to solar thermal for heating water made it easier to reduce oil use elsewhere. Froling Energy of Peterborough, NH, designed and installed a system of three wood pellet boilers to provide most of the heat. The system also included two silos to hold fuel. The wood pellets come from nearby sources in New Hampshire. Compared to bringing in oil from someplace far away, this benefits both the environment and the local economy.

Meanwhile, Building Energy Technologies of Bow, NH, undertook the insulation and air sealing. This was completed with such great care that business was not disrupted in any way.

Since these systems have now all been in place for at least three years, it is possible to report on how they have done. NHSPCA Executive Director Lisa Dennison gave us a rundown on the successes and failures. We can make short work of the failures. There were none.

The NHSPCA completed what she called a "great project." It was one of those things that was simply a joy, from beginning to end. This included not only the people and companies involved, but the results.

The first indication of success was the drop in the use of oil for heating water in the first summer the solar thermal system operated. Oil use dropped, quite literally, to zero. Instead of spending many thousands of dollars on oil, the 1,600 gallons of hot water used every day were heated by the sun. Pollutants from fossil fuel use disappeared with the fuel bills. Since then, the recently installed systems have continued to perform as intended. The money saved in fuel is quickly paying off the loans.

When she was asked if there was anything she regretted about the energy upgrades the NHSPCA got, Dennison said, "Yes. I regret that we did not do this 10 years earlier."

TEN COMMANDMENTS FROM YOUR PET

1. My life is likely to last 10–12 years. Any separation from you is likely to be painful.
2. Give me time to understand what you want of me.
3. Place your trust in me. It is crucial for my well-being.
4. Don't be angry with me for long and don't lock me up as punishment. You have your work, your friends, your entertainment, but I have only you.
5. Talk to me. Even if I don't understand your words, I do understand your voice when speaking to me.
6. Be aware that however you treat me, I will never forget it.
7. Before you hit me, before you strike me, remember that I could hurt you, too, and yet, I choose not to bite or scratch you.
8. Before you scold me for being lazy or uncooperative, ask yourself if something might be bothering me. Perhaps I'm not getting the right food, I have been in the sun too long, or my heart might be getting old or weak.
9. Please take care of me when I grow old. You, too, will grow old.
10. On the ultimate difficult journey, go with me please. Never say you can't bear to watch. Don't make me face this alone. Everything is easier for me if you are there, because I love you so.

The Story and Re-building of a Community's Dog Park

WATERBURY UNLEASHED!

The aftermath of Tropical Storm Irene ravaged more than homes and businesses in Waterbury, Vt. *It also destroyed another important part of this community.*

By N. R. Mallery

Waterbury is among the most visited places in the Northeast. It is home to the world famous Ben & Jerry's Ice Cream, solar-powered Green Mountain Coffee Roasters, Cabot Cheese and Lake Champlain Chocolates outlets, many wineries and solar-powered Cold Cider Hollow, to name a few reasons why this is such a destination point for so many.

In 2010, residents of Waterbury began planning their town's first off-leash dog park. A site was selected, plans were drawn and volunteers came out to help.

Then, on August 28, 2011, Tropical Storm Irene ravaged Vermont and many areas of New England, flooding nearly every stream and river in this area. One third of all of Vermont's property damage occurred in the small town of Waterbury.

All plans for the dog park were put on hold while the town fought to rebuild and recover from all of the devastation.

Four years later, Waterbury is nearly rebuilt, after the help of the incredible effort and strength from the community itself and from all over the state.

So, the time had come to address another important part of the Waterbury community: their dog community. So, a lot of planning and work had to be been done to finally see the Waterbury Unleashed! Dog Park project through and again become a reality.

Much planning had to be done, including re-siting the park's location. After a lot of discussion and consideration, it was decided that it would be rebuilt at an area east of the Ice Center. The land chosen has the proper elevation above the river, is well removed yet accessible, and boasts a natural beauty that will be a very pleasant place for the dogs and owners alike.

Support for the project came from all over the state, including nearby Yestermorrow Design and Build school of Warren, Vermont, which voluntarily chose to "Go to the Dogs." A recent timber-framing class worked with local volunteers to raise the frame on a sunshade shelter for the new dog park. The class project's focus was to benefit an organization or community group. In this case, it just happened to be for a group of dogs, and their owners of course. "It's made from Vermont pine, so the timber was milled locally. The pegs were hand-riven from ash that was also harvested right here in Vermont. And it's all cut with hand tools, with very few exceptions," said Josh Jackson, one of the Yestermorrow part-time instructors. Josh is a builder at TimberHomes, based in Vershire, Vt. The frame is 12 feet by 16 feet, all cut from local timber and held fast with theash pegs. This timber frame workshop was an opportunity for a client (Waterbury Dog Park) to have some of the costs of construction offset by the volunteer labor of the students, as they practice on saws, chisels, planes, and boring machines.

A Yestermorrow Design and Build school class built this timberframe shelter with instruction from TimberHomes, LLC of Vershire, Vermont. Photo: Waterbury Unleashed Facebook photos.

This project is just one of the community's efforts towards the improvements to the park, Boy Scouts from Troop 701 helped out by clearing park trails. Financial support that was also needed to make this a realitycame from all around the state.

In August, 2015, it is finally time for the dogs of this community to be free to play and socialize at Waterbury Unleashed! Learn more at waterburyunleashed.com or 802-244-7174.

Photo: Waterbury Unleashed!

There are many reasons a community builds an off-leash dog park.
Here are a few of the benefits:

- Providing a place for dogs and humans to socialize
- Promoting responsible pet ownership and the enforcement of dog-control laws
- Providing a place for dogs to expend their energy safely, thus reducing barking and other behavior problems
- Providing seniors and dog owners with disabilities an accessible place to exercise their companions
- Promoting public health and safety by isolating a single place where dogs can run free.
- Allowing for realistic enforcement of otherwise difficult-to-monitor ordinances, e.g., on licensing, vaccinations., etc.
- Drawing tourists. People will travel to visit the dog park, bringing their dogs and dollars with them.
- Building the community. The park will provide an opportunity to socialize with others who share the same interests.

HUMANE SOCIETY OF CHITTENDEN COUNTY

Saving $1,000/Yr from Energy Improvements

By N. R. Mallery

The Humane Society of Chittenden County, in South Burlington, VT shelters as many as 90 companion animals on any given day. Hot and cold days make a very real impact on the comfort of both the animals and the people in the building. With a generous $5,800 grant from Green Mountain Power and a cost share from Efficiency Vermont, in June of this year, HSCC is now saving an estimated 8,089 kWh, 106 cubic feet of natural gas per year, and eliminating 10,600 pounds of carbon emissions each year. HSCC estimates a savings of nearly $1,000 per year in energy costs!

Like many small non-profit organizations that rely exclusively on gifts and grants, HSCC is always looking for ways to save money. Improving the energy efficiency of its South Burlington shelter was an important investment to lower the organization's overhead costs and keep its precious residents warm in the winter and cool in the summer.

"We wanted to do the right thing for our animals, for our environment and for our operating budget. But having the upfront cash to do this work was prohibitive," said Nancy Cathcart, President and CEO, Humane Society of Chittenden County.

Each year Green Mountain Power selects a not-for-profit organization in Vermont to offer financial support for efficiency services and upgrades. Thus, with support from Efficiency Vermont and GMP, HSCC contracted with Vermont Heating and Ventilating of Winooski to install four Catalyst Advanced controllers located on the rooftop. In the days following the retrofit, HSCC realized a 20% drop in power usage.

The HSCC located at 142 Kindness Court, South Burlington, VT is a private and independent 501(c)3 not-for-profit organization. They serve both Chittenden and Grand Isle Counties fulfilling their mission to foster compassionate treatment of animals and to prevent animal suffering by sheltering homeless and unwanted pets, timely efforts to place each animal in a responsible and caring home, animal cruelty investigation, feral cat colony management (TNR); and humane education.

HSCC receives no government funding, and is not affiliated with a national organization. They rely almost entirely upon donations from individuals, corporations and foundations to meet the annual $850,000 cost of running the shelter. To learn more visit chittendenhumane.org or call them at 802.862.0135.

Biotech+Wastewater=Free Energy

By George Harvey

Microbial fuel cells, in which microbes make electricity, were first demonstrated as early as 1911. A problem with all new technologies, however, is that in order to have effect in the real world, they have to be practical solutions for recognized problems. Like early photovoltaic systems, the microbial fuel cells languished as scientific curiosities.

> In a larger system, there is excess methane, which can be used to generate electricity to put on the power grid, or for other purposes. Clean water can be reused across a variety of brewery applications.

In 1990s and 2000s, a number of developments not only showed promise, but spurred development. It became clear that there were processes that could use very small amounts of electricity to produce valuable chemicals. One of these, electrohydrogenesis could use a charge of one volt to produce hydrogen at an efficiency of 288%. The process has such a high level of efficiency because the electricity is not producing hydrogen directly, but is used to induce bacteria, which have access to other energy resources such as chemical energy, to make hydrogen.

Electromethanogenesis is a similar process, in which the hydrogen is reacted with carbon dioxide, and the output is methane. Methane is much more useful than hydrogen in some ways. It is easier to store. But more to the point, the methane produced through the process can be used as a high-quality substitute for natural gas with no alterations needed.

A company in Boston, Cambrian Innovation, was started up to use these reactions to treat wastewater while simultaneously generating fuel. One product of their research and development is a small modular system called the EcoVolt Reactor. Another is a membrane bioreactor called the EcoVolt MBR.

The EcoVolt systems are well suited to processing wastewater from the food and beverage industries. For example, brewing uses a lot of water, producing large quantities of waste that has to be treated. By using electrically active microbes to work on the waste, the whole process can be leveraged to convert the waste into much cleaner water that is easier to deal with than the unprocessed waste is, while producing high quality methane.

The methane in a small system is sufficient to drive the system, cleaning water in the process. In a larger system, there is excess methane, which can be used to generate electricity to put on the power grid, or for other purposes. Clean water can be reused across a variety of brewery applications.

An example of how the EcoVolt Reactor does in the field is provided by an installation at the Lagunitas Brewing Company brewery in Petaluma, California. The brewery was having 50,000 gallons of high-strength waste water trucked to a treatment plant each day, and more low-strength waste was sent to a local utility as sewage. This represented a drain on the systems and a large expense to the brewery. It also meant water was being used in large quantities while California suffered in a drought.

The combination of the EcoVolt Reactor and the EcoVolt MBR meant that close to 99% of the waste material in the water was removed, allowing 80,000 gallons of water to be recycled each day, eliminating 1,600 of carbon emissions each year, and reducing the brewery's costs.

Cambrian Innovation's website is cambrianinnovation.com.

GOOGLES' NEW DATA CENTER
Recycle That Old Coal Plant!

By George Harvey

Google recently announced that it will build a new data center at the Widows Creek Power Plant in Jackson County, Alabama. Widows Creek is a coal-burning plant belonging to the Tennessee Valley Authority (TVA). It recently shut down seven of its eight units because they emit excessive nitrogen oxides. Six of these are over sixty years old, and it was not worth upgrading them to eliminate pollutants. The last unit running, which is approaching the age of forty, is scheduled to be shut down in October.

Though we have not heard anything about the old buildings, it is likely that they will be torn completely down. They are old, and they were not built with the expectation that they would possibly outlast the generators and boilers in them. Indeed, they were put up in an age when waste was considered praiseworthy, and building a structure that might outlast its original use was not considered practical. One noteworthy structure on the property is a smoke stack 1001 feet tall, one of the tallest on Earth. Tall chimneys of this type kill birds and can be navigational hazards to aircraft, so it is best torn down.

Google will use 360 acres of the plant's property to accommodate its data center. One valuable feature of the land is that it has considerable transmission infrastructure, and this will continue to be used. The data center will use a lot of electricity, about as much as a small town, and so those transmission lines will be used to bring power in. Since transmission lines are very expensive to build, this particular site was especially attractive to Google.

Google has indicated that the data center will be supplied with power from renewable sources. It will be at least partly supplied by renewable plants elsewhere in the area of the Tennessee Valley Authority. Given the area, which is the northeast corner of Alabama, it is most likely that the power will come from solar farms. As yet, however, we have not heard specifics. Google has historically been interested in supplying some of its own power from its own sites, especially from large rooftop solar arrays.

The project brings to mind a lot of other solar farms and parks that have been put up of late. Solar power is often installed on otherwise useless lands, such as the brownfield sites that remain when landfills are closed. Other sites used for solar in the Northeast include land along highways. But the old power plants, whether coal, natural gas, or nuclear, become often brownfield sites when they close. Coal-burning plants are particularly difficult to clean up, because they often have huge amounts of fly-ash that can be a massive environmental hazard. In fact the Widows Creek plant itself had a fly-ash spill that polluted a stream and the river it flowed into.

Try as we might, it is hard to regret the passing of this plant into history.

Widows Creek power plant. Photo by the Tennessee Valley Authority. This image is in the public domain as a work of the US federal government.

An Energy Efficiency Resource Standard for NH

By Kate Epsen

There is a new development afoot that could open up an opportunity to achieve greater energy efficiency (EE) in NH and thereby dramatically increase demand for EE products and services.

NH has long studied the possibility of having an Energy Efficiency Resource Standard (EERS), but has continually lacked the political will to enact one.

However, in May, 2015, the New Hampshire Public Utilities Commission opened up a critical docket that would implement an EERS.

Now is the time to act. The New Hampshire Sustainable Energy Association has intervened in this process. In order to move the process in a positive direction and achieve a result that creates an EERS with strong goals and realistic funding, we need to hear from New Hampshire residents, and for you to bring your technical resources that can overcome any opposition and inertia. We need you to get involved and help support this effort. Email Kate Epsen today, at kate@nhsea.org.

Kate Epsen is the Executive Director of the NH CleanTech Council and NHSEA (New Hampshire Sustainable Energy Association)

Vermont Council on Rural Development

Rutland Forum to Explore Next Steps for Vermont's Climate Change Economy

From The Vermont Council on Rural Development

Area businesses and nonprofits are increasingly involved with climate change, both the challenges and the opportunities. Their creative solutions are becoming a growing part of our state's economy.

Those who have opinions are asked to express them. What are your experiences? Do you have ideas that can help nurture this sector in Vermont? Join Rutland Mayor Chris Louras and local business leaders for a forum, "What's Next for Vermont's Climate Change Economy?" The Vermont Council on Rural Development (VCRD) is producing the discussion, which takes place at Rutland's Paramount Theater on Wednesday, August 26, from 7:00 pm to 9:00 pm.

The forum is the next step for public input to the Vermont Climate Change Economy Council. This group, which formed following a statewide summit in February, is developing a practical plan to reduce carbon emissions and stimulate green economic development in Vermont. The panelists include Joe Fusco, Vice President of Casella Waste Systems, Betsy Ide, Energy Innovation Center at Green Mountain Power, and Mark Foley, President of Foley Services.

The summit focused on economic development in a time of climate change, including transportation, education, investment strategies, downtown redevelopment, tourism, and efficiency. The report, which provides excellent background material for the forum, is online at bit.ly/VT-rurual-2015-report.

Everyone is encouraged to attend, listen, and share ideas. More information about the forum and the council can be found through VCRD's home page at vtrural.org or call Jenna at 802 225-6091.

Only two other forums are planned. One in Burlington on September 17 and one in Brattleboro on October 6.

The Vermont Council on Rural Development is a non-profit organization charged by the federal farm bill to act as a neutral convener at both the local and policy level supporting the progress of Vermont communities. VCRD will promote the platform of action that comes from the deliberations of summit participants.

Arctic tundra is already changing from a warming climate, causing methane emissions to rise, speeding more climate change. U. S. Fish and Wildlife photo.

NEW CLIMATE CHANGE TOOLS

EPA Launches New Greenhouse Gas Inventory Tools for Local and Tribal Governments

The Environmental Protection Agency has announced that it has launched two free, interactive spreadsheet tools to help local governments and tribes across the United States evaluate their greenhouse gas emissions.

- Local Greenhouse Gas Inventory Tool at http://bit.ly/GHG-local.
- Tribal Greenhouse Gas Inventory Tool at http://bit.ly/GHG-tribal.

Both tools calculate greenhouse gas emissions for many sectors, including residential, commercial, transportation, and waste and water management. Each tool consists of two separate parts: one for community-wide inventories, the other for inventories of local or tribal government operations only.

These tools were designed to make calculating emissions flexible and easy: they are programmed with default data, or the user may enter community-specific information.

CLIMATE REFUGEES

THE BEST PLACES TO LIVE IF GLOBAL WARMING GETS THE BEST OF US

By Roddy Scheer and Doug Moss

Some consider Seattle and the rest of the Pacific Northwest to be a potential refuge for Americans looking to escape drought-stricken southern states. Credit: Howard Ignatius, FlickrCC

If temperatures around the globe continue to rise in the face of human-induced climate change as climatologists expect, some of the world's most populous areas could become uninhabitable. Rising sea levels will flood out coastal areas, while increasing drought will make survival in already arid areas difficult at best. While we may have at least a few decades of runway to prepare ourselves for the worst, planners might want to think carefully about where to put down roots now.

According to the Notre Dame Global Adaptation Index (ND-GAIN) that measures and ranks 175 countries based on vulnerability and readiness to adapt to climate change, Scandinavian countries—Norway, Sweden, Finland and Denmark—just might be the safest spot in the carbon-compromised world of the future.

ND-Gain researchers stress that residents of just about any developed country (including the U.S., Canada, Australia, New Zealand, Russia, China and most of Europe) will likely be fine staying put given the fact that better-heeled governments are already gearing up to adapt to warmer temperatures, more intense storms, rising sea levels and other expected changes. On the flip side, the worst places to be may be mid-latitude developing countries, including most of Africa and South Asia. The countries ND-GAIN predicts will be hardest hit by climate change include Chad, Eritrea, Burundi, the Democratic Republic of Congo, the Central African Republic, Sudan, Niger, Haiti, Afghanistan and Guinie Bissau.

Some consider Seattle and the rest of the Pacific Northwest to be a potential refuge for Americans looking to escape drought-stricken southern states.

Americans looking for the best place to live domestically as the world warms should also look north. Alaska and the Pacific Northwest, both blessed with plenty of water and plenty of terrain well above sea level, are generally acknowledged to be the best parts of the country to be in under a new climate regime. In fact, University of Washington atmospheric science professor Cliff Mass believes the Pacific Northwest will be "a potential climate refuge" in coming decades. He writes in his popular weather blog that Washington State could soon become the nation's premiere wine production region as California's vineyards continue to be slammed by years and years of drought.

Meanwhile, UCLA environmental economics professor, Matthew Kahn, says that otherwise fading cities like Minneapolis, Milwaukee and Detroit will become more and more attractive as their counterparts to the south (Miami, Phoenix, Los Angeles, San Diego) take the brunt of global warming's fury. In his 2010 book, Climatopolis, Kahn predicts that Detroit will be one of the nation's most desirable cities by 2100. Other climate change winners could include Vermont, Pennsylvania, Ohio, Indiana and Colorado.

Not everyone agrees that Detroit will be the golden city of our future world. Author Giles Slade contends in his 2013 book, American Exodus, that we all may be heading for northern Canada when global warming's fury really starts to kick in. "The safest places will be significant communities in the north that are not isolated, that have abundant water, that have the possibility of agricultural self-sufficiency, that have little immediate risk of forest fires, that are well elevated, and that are built on solid rock," he writes. "Our northern lands are our Noah's ark—a vital refuge against the moment of mankind's greatest need."

Contacts: Notre Dame Global Adaptation Index (ND-GAIN), www.gain.org; Cliff Mass Weather Blog, cliffmass.blogspot.com.

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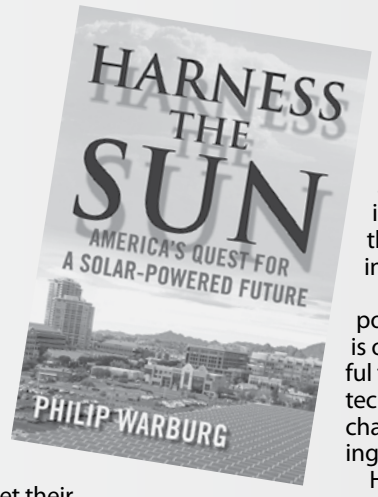
HARNESS THE SUN

AMERICA'S QUEST FOR A SOLAR-POWERED FUTURE

By Philip Warburg, *Beacon Press, Hardcover $27.95.*

Book review by N. R. Mallery



After Philip Warburg's Harvest the Wind: America's Journey to Jobs, Energy Independence, and Climate Stability was published in 2012, he went on to take another in-depth look at a renewable energy technology. His latest work, due out this September, is Harness the Sun: America's Quest for a Solar-Powered Future. Like his earlier book, it displays both depth and breadth of knowledge and posits an optimistic view of our potentials.

Warburg's credentials on energy go beyond the academic. His home is powered by solar photovoltaic (PV) panels. Given this, it is hardly surprising that his research is as thorough as it is. Nor is it a surprise that it is so encouraging.

The United States, he points out, is not the nation with the greatest amount of solar power capacity installed. Solar power, however, is growing rapidly, both here and abroad.

Describing his research into the current situation for solar, he takes us around the country, examining the ways that solar power has been adopted by diverse groups of people. From students to business leaders, from professors to politicians, solar has wide appeal.

One of the things about solar PVs that make them appealing is that they are fundamentally democratic. They can be owned by nearly anyone, providing a measure of independence that had never previously been contemplated. The democratic aspect of solar power is not universally liked, as it puts economic pressure on predominantly monopolistic utilities, requiring them to adjust not only their infrastructure but their business plans.

People who oppose extensive development of solar power sometimes complain about the amount of land it requires. Warburg addresses this. The National Renewable Energy Laboratory provided the information that getting all our power from solar power would require development of about 0.6% of our land. Of course, that does not have to be land we value for some other purpose. It can be on rooftops, parking lots, or land that is hard to use because it has been destroyed in one way or another.

The numbers relating to what can be done with solar PVs on damaged and polluted land are almost astonishing. The United States Environmental Protection Agency did a survey of brownfield sites in our country. Those they identified as potentially useful for solar power would be sufficient to produce about 5,500 gigawatts. Warburg says this would be sufficient to power 800 million households, about seven times the number we have. And that is just the land we would have problems cleaning up for some other use.

The book also provides information on the solar potential of the individual states. Even such states as Maine, Minnesota, and Washington, with poor solar exposure in winter, have abilities to meet their needs several times over.

Warburg goes into the manufacture of solar PVs in some depth, providing us with a fascinating story. He discusses the technologies used for concentrating solar, in which heliostats focus the sunlight to make it brighter or hotter. Then, having dealt with solar manufacturing, Warburg goes through the lifetime of solar systems, up to the point when the panels need to be dismantled and recycled.

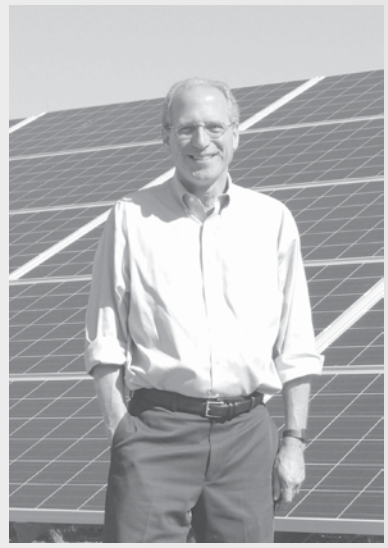
He compares solar systems with those powered by fossil fuels and nuclear power. He says, "[A] power plant that relies on a carbon based fuel like coal gas or oil creates an energy deficit from the moment its fuel is extracted from the earth." He goes on, "Every kilowatt-hour of power is dependent on the burning of a polluting climate-changing nonrenewable energy source." The disadvantages of fossil fuels are clear. Coal, natural gas, and nuclear are all found wanting, as none is economical in the long run, and all have potentially huge environmental problems.

Warburg addresses the politics of solar power, especially as it affects how we develop as a society, bringing energy independence to many people, and with distributed resources providing security and efficiency. He examines the competition and trade wars between international solar industries.

And he talks in some detail about the potential for solar power in the future. This is one of the most interesting and hopeful topics of the book. We clearly have the technologies we need to combat climate change and address pollution while achieving energy independence and security.

Harness the Sun is an exciting book. I highly recommend it.

It will be available on September 8.



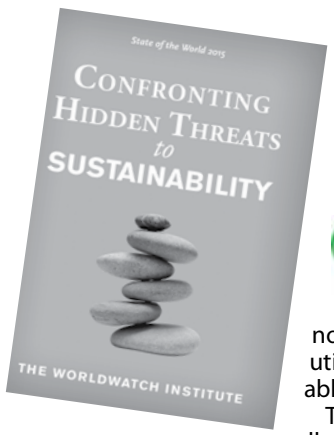
Philip Warburg. Courtesy photo

State of the World 2015:

CONFRONTING HIDDEN THREATS TO SUSTAINABILITY

By The Worldwatch Institute, Island Press, 140 pages, $19.99

Review by Tammy Reiss



This year's publication by the WorldWatch Institute, State of the World 2015: Confronting Hidden Threats to Sustainability is well worth reading. Fourteen authors of the institute compiled the latest economic and scientific data along with their professional and personal perspectives on subjects not widely covered elsewhere. Among its articles are "Energy, Credit, and the End of Growth," "Emerging Diseases from Animals," and "Migration as a Climate Adaption Strategy."

This volume moves the reader to rethink the status quo. One of the most obvious threats to sustainability is from energy as a driving force for our current economy, based on an incessant growth model and a gross domestic product calculation that considers neither the environment nor sustainability. Sobering information is discussed, as this quote shows:

Researchers estimate that detecting 85% of the viral diversity in mammals would cost around $1.4 billion or $140 million per year over 10 years. This is a small fraction of the cost of an emerging disease event (the 2003 SARS outbreak, for example, cost the global economy an estimated $30 billion-plus).

The volume discusses findings by scholars and scientists who study the economy, the Earth, and the interactions between them, and draws profoundly troubling conclusions.

It also brings to light a major sustainability threat from policy-makers and the voters who elect them. Officials at all levels of government have been responsible for picking technologies and infrastructure that quickly become outdated or inappropriate for sustainability. Unfortunately, the chapter dealing with this provides no example, though one comes easily to mind. We are building out gas infrastructure, on both federal and local levels, to accommodate expansion and gas's use, despite the fact that it is just another dirty fossil fuel that will eventually run out. Our nation is switching coal-fired power plants, the trucking industry and entire communities over to natural gas, which ultimately is neither efficient nor sustainable, instead of utilizing sources of renewable energy.

This volume does not give all of the answers about why our kind is still acting to destroy our planet's biodiversity for future generations, despite all of our governance, environmental impact assessments, and generally robust regulatory systems. Nevertheless, it will have you asking yourself, as the world passes environmental tipping points, how much longer our nation's people will keep turning blind eyes to the need to have a sustainable society.

Tom Prugh, one of the project directors for Confronting Hidden Threats to Sustainability, says, "It is time for Homo sapiens to live up to its somewhat presumptuous Latin name, and grow up."

Tammy Reiss is a conservationist and focuses her attention on the local region of central New York, where she lives. She teaches and promotes energy efficiencies and independence through renewables in the Marcellus Shale regions of NY State.

Rising Seas

Cont'd from p.3

be prevented by holding temperature rises to 2° C. The feedback loop may already be underway, and it would cause seas to rise by a number of meters over the coming decades.

Specifically, the paper says, "If the ocean continues to accumulate heat and increase melting of marine-terminating ice shelves of Antarctica and Greenland, a point will be reached at which it is impossible to avoid large scale ice sheet disintegration with sea level rise of at least several meters."

We might pause here and consider what a rise of several meters would look like. Three meters is about ten feet. That might not sound like much, but it would inundate many major cities around the world. Storms, which are also projected to be much worse, would cause the high water marks to be meters above that. In a place like New York or Boston, this could make maintaining the subway infrastructure untenable. It would make homes all along nearly all coasts of the world uninhabitable, and with them, destroy highways, chemical plants, nuclear power plants, and so on.

Of course, if we fail to limit greenhouse gas emissions, and the temperature rises by 3° C or more, things will be much worse. Scientists, looking at the promises countries make as they plan for COP 21, say they expect the limited actions described will not be enough to prevent a 3° C rise.

We must do better, and that is why Hansen and is colleagues are publishing their paper for all to see, as they are.

DEEP ENERGY RETROFIT

INDOOR AIR QUALITY

By Michael Goetinck

If you've ever been in a room where the air felt "too close" or you've ever experienced the need to step outside for a breath of fresh air you have an intuitive understanding of the importance of indoor air quality.

Indoor air quality is affected by many things. Building assemblies, components, items in the home, occupants and their behaviors, and the quality of the air outside the home all play a role. Indoor air quality is a function of air infiltration and ventilation. Sometimes these air exchanges happen intentionally and sometimes not. In an efficient home ventilation has to be intentional since there has been a great deal of attention paid to reducing air infiltration. Therein lies the apparent irony: you've spent a great deal of resources (time, money, and thought) on reducing the number of air changes per hour and now you have to add some back into the mix. The difference between unintentional and intentional ventilation is that the first method leaves it to chance and makes the building less efficient, whereas the second is by design and makes the building more efficient.

A whole-house energy recovery ventilator (ERV). Photo courtesy of Michael Goetinck

One may question the need for mechanical ventilation since it's hard to know how necessary it really is without actually testing the air quality. A friend of mine used to test indoor air quality for large commercial buildings and he told me that you can't just test air to see if it's healthful or not. You have to test for specific things. Since there are so many substances that can adversely affect the quality of the air; testing for all of them, and then monitoring on an ongoing basis isn't something that most homeowners are going to undertake. In the world of sports it has been said that the best defense is a good offense and the same is true in the world of residential air quality: mechanical ventilation is part of a good offense. Continually exchanging indoor and outdoor air prevents moisture and pollutants from concentrating in the home thereby reducing the risk of creating an environment that is detrimental to the building and its occupants.

I've written about moisture mitigation in previous articles and the need to manage it at the source. Cooking and cleaning (house, and personal) are two significant sources of moisture resulting from day-to-day living in a home and it's best to get the moisture generated by these activities out of the house as quickly as possible. This can be accomplished with exhaust fans or heat recovery ventilators (HRVs) with exhaust boosts. There are some whole-house systems that can eliminate the need for site specific exhaust.

Most non-moisture related contaminants from people, pets, and items normally found in people's homes can be prevented from reaching harmful concentrations by installing a HRV in a heating climate or an Energy Recovery Ventilator (ERV) in a cooling climate to exchange indoor and outdoor air. The amount of air being exchanged can be set on most units and it's a good idea to change the settings as the use of the space changes. For instance, the setting should be adjusted if the number of people in the home changes.

If you are building a new home or doing a "deep-energy retro-fit," mechanical ventilation needs to be part of the plan. If you want to make an existing home more efficient, I recommend using a blower door to calculate the number of air changes per hour the building currently experiences and use that information to determine at what point in the process you need to install mechanical ventilation.

A bathroom fan helps with indoor air quality. Delta BreezSmart photo courtesy of Rita Carbone-Lawson, Delta Products Corp.

This series will continue in Green Energy Times, where the author will cover other topics that can help achieve the deep energy measures which help buildings' energy performance, and so can benefit us all.

Michael Goetinck is the owner of Snowdog Construction, Ltd, in Norwich, VT. This series will continue in Green Energy Times, *where the author will cover other topics that can help achieve the deep energy measures which help buildings' energy performance, and so can benefit us all.*

Touring a Foam-Free Passive House Project in Wayland, MA

By Stephen Dotson

On August 7, the Northeast Sustainable Energy Association (NESEA) organized a BuildingEnergy Pro Tour of a 2,500-square-foot home that will be the first certified passive house in Wayland, MA. BuildingEnergy Pro Tours are half-day tours of high-performance homes all over the Northeast led by members of the project teams behind them, concluding with a reception and workshop or Q&A session. Pro Tours are an opportunity for sustainable building professionals to get to see projects in progress with their own eyes, share knowledge, and learn from colleagues.

This particular Pro Tour was led by NESEA members and tour hosts Nick Falkof and Mike Dutra from Auburndale Builders; Michael Hindle, the project's Certified Passive House Consultant (CPHC); Mike Duclos, the PHIUS+ rater for the project; and Donald Grose, the project designer. The project team welcomed a group of 81 to peek inside the yet-unfinished home and learn about its energy modeling, construction process, siting, and much more.

Prior to this project, the preexisting house was deconstructed piece by piece and the materials donated to a local nonprofit for reuse. Once cleared, the lot needed to be oriented to accommodate a wetland area and a buffer zone required by code. This added complexity to a project that already defied many expectations of what was possible with passive house design.

The home will be certified through PHIUS to meet the passive standards, which have recently become more climate-specific. On its way to meeting those standards, the project team went to lengths to ensure that the insulation of the house was an entirely foam-free enclosure, due to concerns of the greenhouse-gas impact of foam products. In terms of generation, the new home will eventually be powered by a photovoltaic array on an adjacent lot and generate more energy than it uses.

Above: The view of the Wayland passive house project from the driveway. Below: Michael Hindle, certified passive house consultant, explains how various components were assembled to ensure compliance with air-tightness and PHIUS standards. Bottom rt: One of the most popular features of the Wayland passive house: the passive pet door! To learn more about the Freedom Pass *pet door see their ad on p. 20. Photos courtesy of Stephen Dotson* (NESEA).

Besides its passive house credentials, one of the most important aspects for the client was that the house be designed to be resilient and remain accessible for the clients as they age in place. In addition to the energy and carbon footprint, the rainwater from the house will be harvested and used for irrigation via a large cistern on the property.

One notable challenge was handling the potential for radon. How does one ensure that the tightness of a passive house isn't keeping in this harmful gas? This required special attention to the foundation, thermal bridging, and envelope, combined with a unique sump-pump solution to clear the home of any potential radon.

Perhaps one of the more interesting features of the project was the inclusion of a door for pets that met passive house standards! The door was custom-built by Auburndale's own Mike Dutra and enables entry and exit by the client's cats without loss of heat.

The tour concluded with a reception and a presentation entitled "Going Foam-Free in Passive Construction" by Michael Hindle, who is also president of the Passive House Alliance-US.

NESEA's Program and Developer Director, Miriam Aylward, organized the event and reflected afterwards:

"This was our first ever sold-out Pro Tour, which speaks to the caliber of the project … everything from the foam-free enclosure, to the passive house cat door and innovative radon detection system generated lively discussion and authentic learning."

Due to demand, the hosts of this tour have agreed to run a second Pro Tour on Friday, November 6, 2015. Whether you have been to the tour already, or if you were not able to snag a spot on this one, it will be exciting to see this great project three months further along.

To register for the November 6 Pro Tour, visit www.nesea.org/11-06-15. Also, in the early fall of 2015, NESEA will be sending out a request for proposal (RFP) for projects to include on Pro Tours in 2016. To make sure you get the RFP, join NESEA! Hosting a Pro Tour is a NESEA member benefit.

Tallest Passive House in the World

by George Harvey

The Cornell Tech dormitory will be the tallest Passive House building in the World. Artwork by Handle Architects.

Cornell Tech, part of Cornell University, is a new applied-sciences campus in New York City, on Roosevelt Island. The first classes started in 2013 at temporary quarters in a building Google owns on EighthAvenue. Construction began on Roosevelt Island late the same year.

The campus will be very environmentally friendly. A lot of green space is designed in, and the buildings are all being designed and constructed to the highest standards. Consideration for carbon emissions has been particularly painstaking.

The university is working with the Hudson Companies and the Related Companies to develop the campus' dormitory, which is 250 feet tall and will house 520 people, including students, faculty, and staff. It is a noteworthy structure for many reasons, two of which are of particular interest. One is that it will be the first high-rise residential building ever to meet Passive House standards. The other is that it will be the tallest Passive House building in the world. The building's design is being undertaken by Handle Architects.

One of the toughest problems in building to the Passive House standard is dealing with air infiltration and ventilation. Every tiny crack has to be sealed to prevent untreated cold air from entering the building and wasting heat. At the same time, ventilation has to be maintained for the health of the occupants, and preservation of the contents of the building. The design team specified a special heat-retaining ventilation system that was not covered yet in the building codes of New York City, so special permission had to be obtained for it to be installed.

Standard construction for the Passive House standard requires a doubled outer wall for insulation. To meet that standard, the amount of glass was significantly reduced. Fully glazed walls might have been nice because of the rather grand views the building would have, but they were not included because of costs. The designers opted for somewhat smaller windows instead.

The Passive House standard brings a building to the point that ordinary human activities provide enough heat for comfort, nearly all the time. The occupants' body heat, cooking, and electrical equipment such as computers, and solar gain are all heat sources. A Passive House building should have backup heat, but it should not be needed much at all.

In the end, the design of the building makes it possible to reduce energy consumption by 70%. Remarkably, this is accomplished by a 5% increase in the cost of construction. Since the cost is $115 million, this is not an insignificant figure. Nevertheless, with such a large reduction in heat consumption, the cost increase should be recovered rather quickly, and will be repaid many times over in the expected lifetime of the building. The elimination of 882 tons of carbon dioxide each year is just one more benefit.

Because it is so visible, the Cornell Tech dormitory is expected to influence building design elsewhere. It will be an object of study for current architects and builders. It will also be an object of inspiration for the students who live there.

Garbage Patches in our oceans

cont'd from p.18

But even large birds get their intestines blocked by larger bits of plastic.

A study released in early July says that seabird populations have declined by over 70% in the last 60 years. Overfishing is partly to blame. Much of the decline is due to climate change. Some is the result of oil pollution and releases of chemical poisons. Plastic waste and other debris in the Garbage Patches have been major contributors to avian mortality.

We should give thought to where all the toxic junk in the gyres comes from. Surely some of it comes from ships and offshore rigs of one type or another. An appreciable part of it comes from litter at beaches and in rivers. Some is washed down sewers, after it was disposed of improperly. There are about eight million tons dumped in the sea each year. Unfortunately, since nearly all plastics decompose poorly, when a bird or fish dies, the plastic in it is likely to get released into the environment, to kill again.

There are three things we really need to do to stop this. One is to stop using plastics as much as possible. The second is to dispose of them properly or recycle them. The third is to discontinue use of nonbiodegradable plastics wherever possible.

Achieving these goals might be a lot easier if the environmental costs of the plastics we use were included in the original price. Many people would object to such a tax. But developing problems in the environment constitute a hidden tax imposed on all of us by the manufacturers, who disclaim any responsibility for damages done by the products they make.

NH REPA Benefits for Building Efficiency

By GET staff

Just about anyone interested in buying, building, or retrofitting a building in New Hampshire, whether as a customer or as a professional, might benefit from knowing about the New Hampshire Residential Energy Performance Association (REPA). REPA's membership is made up of individual certified energy professionals who work in the field of building efficiency in New Hampshire.

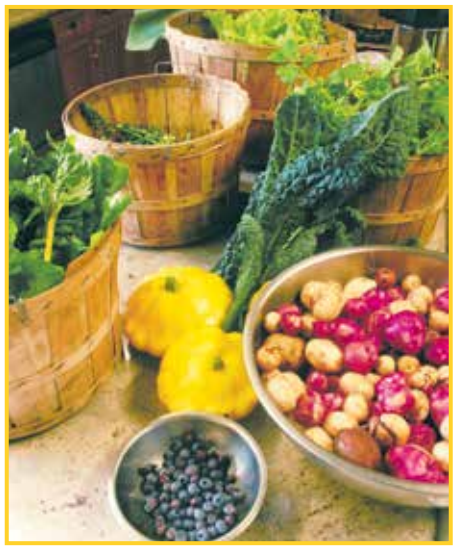
REPA promotes building-energy best practices in New Hampshire. Part of its work is making the best information available to its members, who are experts in the field. Members begin as associates, and after a year they may move to full membership by demonstrating skill and knowledge. REPA provides informational services, including classes, to keep all members up to date with best practices. This is important in a rapidly-changing field.

REPA provides the people of New Hampshire the service of listing those experts who are known to be qualified. An online search engine can help home owners find energy experts by location and skill set, making it easier for people to connect with the best person for a job. REPA also is a source of general information on building energy topics.

REPA's website is www.repa-nh.org.

A PERMACULTURE HARVEST

By Josh Trought



In the Northeast, with our short growing season, the practice of developing a resilient food system depends on preserving the harvest through the winter months. Preservation provides a mechanism to extend food availability beyond fresh picked.

A goal of food preservation is to embody the least amount of energy in the process while maximizing the flavor and nutritive qualities. The process allows the wealth accumulated in fresh food to be stored until the next harvest. There are multiple options, recipes, and methodologies for preserving the harvest that have been utilized by humanity throughout history.

Food products must be preserved with care. Improper storage can result in spoilage, and the subsequent loss of time and energy invested. Undetected spoilage can also result in food contamination, which can be a serious health hazard. In particular, meat and canned low-acid foods such as tomatoes, green beans, and cucumbers should be processed and stored with care to avoid contamination issues.

Freezing is a relatively new option to preserve food. The post–World War II industrial era brought freezer storage capacity to the general population of the United States. Freezers saved the time and effort of canning and other means of preservation. Frozen food was relatively easy to process and prepare, and popularized for our generation by TV dinners and microwaved conveniences. Aisles in groceries were soon lined with freezers catering to these profitably packaged products.

Freezers consume large amounts of energy to maintain this luxury. The majority of homes and stores in America rely on fossil fuels and nuclear energy to maintain these frozen spaces. Freezer trucks are required to transport the subzero cargo across the United States. This fragile, insecure network is dependent on continuous inputs of energy to deliver caloric value to the people.

For all the energetic consumption, the results obtained from this preservation option are also dubious. While the initial processing may be quick and simple, with the exception of ice cream, the quality of the food is always diminished by the process. Colors fade and textures become limp and soggy as a result of freezing. No food product is as nutritious or flavorful as it once was before being frozen.

Freezer failures can also result in catastrophic food losses. The mechanization of this food preservation method means that our food security depends on our capacity to repair and maintain this technology.

Fortunately there are many traditional food-preservation techniques that have enabled humans to store their harvests at least until the next growing season. These include smoking, canning, fermenting, dehydration, root cellaring, pickling, and processing of dairy and meat products. Canning requires an initial investment in containers and the energy of preparation but has provided reliable food for generations. In addition to fermenting beverages, humans can derive nutrition from fermenting cabbage by creating sauerkraut. Infrastructures such as smokehouses, icehouses, and root cellars are all traditional to our region, and all provide reliable, flavorful, and low-tech alternatives to dependence on the freezer process.

One of our favorite alternatives at D Acres is the solar dehydrator. The unit consists of a solar heat–collecting mini-greenhouse and racks of plastic screened trays which allow the hot air to circulate up through the unit. There is also a wood firebox below the screens in case cool weather necessitates a smoldering fire to be maintained.

There is an entire chapter dedicated to food preservation in The Community-Scale Permaculture Farm published by Chelsea Green, based on practices at our farm in Dorchester, New Hampshire. D Acres is hosting a three-day Nose to Tail Porcine Festival this November 68, where we will prepare traditional dry-cure and smoke recipes. Contact www.dacres.org for more information.

Josh Trought is the founder of D Acres farm in Dorchester, NH, and the author of The Community-Scale Permaculture Farm that was reviewed in the June 2015 Issue of Green Energy Times. You can also read the review at http://bit.ly/1TiXpPK.

Harvest rewards at D Acres Permaculture Farm. Photos courtesy of D Acres.

EMERGING FRONTIERS IN BIOENERGY

FULL SUN COMPANY

Processing the Seeds of Local Food System Change

By Austin Robert Davis

In early 2014 Full Sun Company, a start-up business, was co-founded by Netaka White and Davis McManus. Fueled by an interest in helping family farms grow, Full Sun began processing sunflower and non-GMO canola oil crops into specialty food-grade oil and high-protein meal for the farmers. Sunflower and canola oil distribution picked up quickly through local CSAs, farm stores, specialty food shops, health and wellness centers, and direct sales to chefs in the Northeast.

Netaka White previously served as the Vermont Bioenergy Initiative's (VBI) program director, which directly helped to develop the business model to nurture farm partnerships, both as growers and recipients of oilseed meal – the other product that's generated from making the oil. At Full Sun oilseeds are pressed with large machinery, producing oil and a granular meal. The team at Full Sun Company learned a lot about seed storage and oil pressing from the early VBI grantees, such as John Williamson of State Line Farm, and Roger Rainville of Borderview Farm.

The first of the two products, the seed meal, has been used as fuel for pellet stoves, or in the case with Full Sun, sold as fertilizer for crops, or nutritional meal for livestock. At full operation, Full Sun can pump out one ton of meal per day – necessary to meet the growing demand of such customers as The Intervale in Burlington, Vermont and several local pig, poultry, dairy, and beef producers.

The second product, the oil, is used as culinary oil for cooking. To maintain quality standards for their products, Full Sun Company diverts any of the oil that does not meet their standards to Vermont Bioenergy Initiative biofuel producers to undergo further processing and become biofuel. Approximately 250 to 300 gallons of off-spec oil for biodiesel has been produced since February 2014.

In October 2014, Full Sun Company halted operations to make room for growth to meet the increased demand for their products and scale up to align with Vermont's accelerating agricultural economy. White and McManus acquired the former Vermont Soap building in Middlebury, Vermont in order to build a full-scale mill and achieve their anticipated greater capacity. Over the course of one of the coldest winters in recent history, the Full Sun team made the renovations and adjustments needed to repurpose the building into the first non-GMO- verified oil mill in New England. By March of 2015 Full Sun Company had pressed sunflower and canola seeds to make their first batch of specialty oils. The new operation can yield 130 gallons of oil per day – about 2600 gallons per month!

White notes, "David and I are in this with the interest of having a transformative effect on local agriculture and food systems," showing no shortage of innovation or ambition. As a sign of progress, the operation is certified GMO-free, and the next steps are being taken towards becoming certified organic.

As it grows, Full Sun would like to buy from local grower-suppliers and work with local businesses to package and label feed that is to be distributed to farmers of varying sizes, from backyard chicken growers to larger operations. Collaborating with Vermont breweries and distilleries is also planned. Full Sun is working with one local distillery to put together a package for farmers so they have markets for profitable grain crops throughout four years of rotation (rye, wheat, sunflowers, etc.) and can offer farmers better than the indexed prices for these locally grown grains and oilseeds.

Learn more about Full Sun Company at www.fullsuncompany.com.

Austin Robert Davis is an intern with the Vermont Bioenergy Initiative, a program of the Vermont Sustainable Jobs Fund. Learn more at www.VermontBioenergy.com.

Top left: Brandon VT Canola Field. Non-GMO canola field in full bloom in Brandon, VT. Photo: Full Sun Company. Above: Full Sun Company employee, Zach Hartlyn, moves an off-spec oil barrel for biodiesel production. Photo courtesy of Full Sun Company

Many thanks to our Sponsor

Garden Product Review

Cate's Gardens – Pruning Shears

Left two pictures: Cate's Garden Bypass Pruning Shears in action. Far left is the Bypass Pruners; next is the Ratchet Pruning Shears cutting a larger branch. Above left shows the oil well; top rt. corner is a photo of the Ratchet Pruners. Below them shows the Bypass Pruning Shears. All Photos courtesy of Chris Morin.

By N. R. Mallery

Two pruning shears came in from Cate's Garden for review. They are both of the highest quality and are available together on Amazon Prime for $61.94

I LOVE these pruning shears!! Oh my goodness – they're just the best I have ever held in my hands!!

They are actually fun to use. I make others try them because I want everyone to see how great they are – and find myself cutting off branches everywhere. The ratchet pruners really surprised me, both because of how incredibly different its action is and how incredibly well it works. The ratchet pruners cut through really thick branches – ones I never would have attempted with pruning shears. There is even an oil well at the end of the ratchet pruners to lubricate the blades.

I'm looking forward to September (the next month with the "R" in it as a pruning month) to get some really good pruning done for the end of this season.

Both of these pruning shears are probably the last ones I will ever need to buy! They're about perfect. I definitely recommend them to any gardener and homeowner.

Bypass Pruning Shears – Cate's Garden 8" Premium Hand Pruner – The list price is $42.99, but these shears can be purchased on Amazon Prime for $28.99.

These shears are forged with SK5 Japanese cutlery high-carbon steel blades for heavy-duty durability and hard chrome plating for rust resistance. According to Cate's Garden, they are manufactured with the highest quality techniques for a sharp, clean, and precise edge, and they are manually tested and oiled.

The design is ergonomic for comfortable operation, with a specially designed 45-degree angled blade head to allow pruning at awkward angles and difficult-to-reach places while reducing wrist fatigue. The lightweight, curved aluminum handles have a shape that feels sculpted for comfortable use and anti-slip thermoplastic-padded shock absorbers for continued comfort over the long haul.

These shears have a 3/4-inch cutting capacity. They are built to be tools we would use day in and day out for flower and vegetable pruning and maintenance. A sap groove on the lower blade reduces gumming and is easy to clean. High-quality heat-treated tensile wire allows spring-back action. They have an easy-to-operate drop-forged aluminum snap lock for storage.

These are great light shears and are perfect for pruning and trimming flowering plants. They are easy to hold and use, and they are very handy. But they are also very sharp and cut surprisingly easily. Discovering that they did equally well cutting thick stems and the thinnest shoots came as a pleasant surprise. Another pleasant surprise was how easy they are to squeeze, reducing fatigue. The safety catch slides into whichever position I want very easily.

Easy Action Ratchet Pruners – Cate's Garden 8" Easy Action Anvil-type Pruners – The list price is $48.99, but these shears can be purchased on Amazon Prime for $32.95.

These pruners have three-phase, lever-assisted cutting power. To operate them, simply cut into a tree limb, press once, release, press twice for double the power, release, and press down a third time for five times the power. The ratcheting mechanism latches onto the limb, increasing the power with each step and slicing through a branch with ease.

The shears are also forged with SK5 Japanese cutlery high-carbon steel blades for heavy-duty durability. They are ground on both sides to maintain symmetry and to keep the cut straight, and are coated with nonstick Teflon® to resist sap and gumming up of the blade. They have the same sharp, clean, and precise edge as the bypass shears and are also manually tested and oiled.

The sculpted aluminum frame also has an antislip thermoplastic-padded shock absorber on the top handle for comfort over long use. There is a finger guide and protective loop on the bottom handle.

These are anvil-type ratchet shears with a 7/8-inch cutting capacity for all-purpose garden and tree pruning. A bottom serrated edge grips branches better while cutting. The shears have a high-quality spring-back action, an easy-to-operate thumb lock, and built-in oil well for blade maintenance.

Like the bypass pruning shears, these are sharp and strong, with a comfortable fit for the hand. They also have a self-oiling system.

For those who have never used ratchet pruning shears, they will come as a pleasant surprise. The idea of squeezing the tool multiple times may not come intuitively, but once it is tried, it will not be forgotten. These are heavy-duty shears, and they will cut thicker branches than the bypass pruning shears.

Cate's gives a 100% satisfaction guarantee on these products, with no questions asked. You are guaranteed to love them!

NOTE: Discount for G.E.T. readers. Cate's Garden is offering G.E.T. Readers a 30% off discount for any of their products at Amazon.com. Use the coupon code "greene30" for any Cate's Garden product at checkout, until November 3, 2015. The Amazon page is at bit.ly/Cates-Garden-at-Amazon. Their website is catesgarden.com. 1-877-959-1817.

Upcoming Events

Herbs for Family Health
Weekend Workshop
10/16 & 10/17 • $200 with lodging
with renown co-author & herbalist Nancy Phillips of *"The Herbalist's Way: Sharing Plant Medicines with Family and Community"*

Raising the roof in Rumney NH!
Barn DANCE
September 12th at 7 p.m.
Featuring Traditional Contra Dancing with the Old Sam Peabody Band!

NOSE to TAIL *porcine tasting*
A Celebration of Whole-animal Cookery!
All are welcome to join in the festivities of tasting our cookery creations. Entry to the tasting event is sliding scale $5-25 per person. You will be able to enjoy appetizer size plates of porcine delights, local cheeses, & homemade breads.
Nov. 8

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CROSSROADS ACADEMY'S NEW SOLAR SYSTEM

By George Harvey

The 40kW system is providing power and a lasting legacy for the campus at Crossroads Academy in Lyme, NH. Photo courtesy of Kim Quirk, the owner of Enfield Energy Emporium and the installer for this solar project.

The people at Crossroads Academy in Lyme, New Hampshire, have added a new photovoltaic (PV) array to help power its campus. The 40kW system is providing power for the campus. Its 144 solar panels are on the campus in three rows of a fixed ground mount. The story did not begin, and does not end, with the addition of a few PV panels and savings of a bit of money.

It happened that the Head of School, Jean Behnke, was retiring. During the course of her stay at the school, she had developed relationships with large numbers of people, and some of these wished to honor her for the work she had done there. One of the foundations that knew and appreciated her work offered to fund a legacy for the school in her honor. When she was asked what she would like that to be, she said she would like to see something that could benefit it both financially and educationally. This led to the idea of a solar array for the school. It would provide both electric power for the school and a demonstration of renewable energy to the students.

She knew the system she wanted would cost more than the first foundation was able to give, so she went to a second. There, she got a matching grant. With a little support from a rebate incentive, she was able to get the system she wanted.

"It is wonderful to leave a lasting legacy," Behnke says. Given the lasting ability of solar systems, which seem to go on endlessly, it seems especially fitting to choose such a legacy.

The solar system was installed by Energy Emporium of Enfield, New Hampshire. Kim Quirk, who runs Energy Emporium, says this is the company's largest installation to date. The needed paperwork was completed before the net-metering cap for Eversource, the local utility, was reached. Work began on actual installation at the beginning of summer 2015 and was completed in only a few weeks. At the time this is written, the final testing and approval by the utility is all that remains to turn the array on.

Quirk described this, saying, "It is a fun project and soon will be live on the public monitoring site." Public monitoring means the students can look at the system from computers, seeing how much electricity is being generated at any time. They can compare the numbers on output with the weather outside, so they can see the difference between amounts of energy generated on sunny days and overcast days.

Lyme has been a leader in the New Hampshire solarize movement. In fact, a sidebar on page 10 of this issue of Green Energy Times shows that it is tied for first place for the total number of systems being installed, and is in second place on a per-capita basis. These numbers will change, of course, as we approach the finishes for the solarize programs involved. At the time of this writing, the 1,716 residents of Lyme had already accounted for purchase of 58 systems.

The Crossroads Academy solar array is not part of a solarize program, however. Its 40kW will have to be added to the capacity installed under the program to find out what Lyme has added.

We would like to offer our congratulations to Crossroads Academy and to Jean Behnke. Well done!

Wind Measuring equipment for Loell School

Donated Wind-Measuring Equipment Allows Innovative Learning for Lowell Graded School's Students and Teachers

By N. R. Mallery

In June, 2015, Green Mountain Power announced that it has donated a tower to measure wind speed to students at the Lowell Graded School. The wind-measuring equipment has enabled teachers to expand the science and math curriculum for students who are becoming "weather experts."

"I've been amazed to watch the students engage and learn from the meteorological tower that Green Mountain Power gave the school," said Anita Gagner, principal of Lowell Graded School. "GMP is a great neighbor, and it's wonderful that we have a working wind farm in our community that can provide opportunities like this to help enhance our ability to teach science to our students."

Green Mountain Power used the meteorological tower to measure wind speeds prior to building its Kingdom Community Wind plant in Lowell. In addition to helping lower rates for customers, the 21 turbine plant continues to meet strict state environmental and sound standards, while also exceeding power expectations, generating more than 5% above the forecast for the fiscal year, which began October 1, 2014.

"We are thrilled to be able to be a part of the Lowell community and appreciate their strong support for Kingdom Community Wind," said Dorothy Schnure, GMP spokesperson. "Donating the wind-measuring equipment is a great way to bring the science and math to life for students."

The sixth graders at Lowell Village School use the data from the met tower's barometer to learn about how high and low air pressure are used to predict the weather. They also made their own versions of the weather instruments and compared the data they collected with the data from the met tower.

"The meteorological tower has greatly assisted in instructing the students on ways that weather changes affect activities and events in our everyday life. In this way, they can think about how weather has important consequences for all people in our communities. We are very appreciative of this opportunity," said Steve Mason, chair of the Lowell Graded School Board.

The met tower stands 45 feet tall and is installed just outside the Lowell school. Renewable NRG of Hinesburg donated parts and assisted GMP with equipment installation. Data from the tower includes anemometers (wind speed sensors), wind direction sensors, as well as temperature, barometric pressure, and relative humidity sensors. The students can retrieve the information from a data card at the base of the tower, or they can receive it via email. Up to three people can receive the data daily and forward it to the entire classroom.

The mission of Lowell Graded School is to provide a safe, challenging and engaging learning environment that promotes achievement and is tailored to individual student needs. *Their website is http://lgs.ncsuvt.org*

The wind-measuring tower that was donated to the Lowell Graded School from GMP. inset is a close up on the Solar powered data logger for the wind-measuring equipment at Lowel Graded School, with a Temp sensor, Barometric pressure sensor and Relative humidity sensor. Photo: Dotty Schnure, GMP.

This is How You Do It!

Above Kern Center under construction. Below: Artist's rendering of Kern Center lobby. All photos courtesy of Wright Builders.

cont'd from p.1

Net-zero energy use should not be a new idea for regular readers of Green Energy Times. We are not all used to considering some other things the LBC holds important, however, and net-zero water use is just one example. Also, in the LBC standard, everything in the building must be safe, from ingredients in paints and carpets to potential biological problems. Over a dozen types of chemicals are not permitted, including not only asbestos and lead, but polyvinyl chloride (as in plastic plumbing pipes). Everything used in a building has to be sourced as locally as possible. Everything has to be documented, right down to nails and glue. Also, it is not just the building that is taken into account, but the land it stands on.

Clearly, such a standard is not achieved by accident. It should hardly be surprising that only about ten buildings in the United States that have been certified so far.

What is really surprising is that a single Massachusetts company is undertaking construction of two buildings with the intention of getting LBC certification, and both buildings are on the campus of Hampshire College, in Amherst, Massachusetts. This company is Wright Builders, in Northampton, Massachusetts. It is currently building the R. W. Kern Center, which will house the admissions and financial aid offices of the college, and the Hitchcock Center for the Environment, an educational facility that will also be located on the college's grounds. We do not have room here to deal with both projects as well as we would like, and so we will cover the Hitchcock Center in the October issue.

Carl Weber, Associate Director of Buildings and Grounds for Hampshire College, is one of people at the college who is knowledgeable about the LBC. A conversation with him opened with his pointing out all the challenges in the process, and saying the surprising words, "Getting to net-zero energy is the easy part." We are at least intellectually prepared for the idea of net-zero energy. Net zero water is a bit more difficult to imagine. For those interested, we suggest going to bit.ly/Kern-Center-LBC, and looking at page 14.

The center's roof will do double duty. When it is sunny, solar panels will provide electricity. When it rains, the roof will collect water for storage in cisterns. From there, it is put through a series of filters, and passed to interior systems for drinking and cleaning. Cleaning water passes to a gray-water system, starting with filtration in indoor planters. From those, it can go back into the interior gray-water system or to a constructed wetland system and leaching field. Building condensates go to a system of rain gardens and swales.

Composting toilets keep human waste out of the water stream. The only town water coming in is town water for the fire-sprinkler system.. Aside from that, water only comes to the property from the sky, and only leaves in the ground or through evaporation. There are a number of reasons why this is beneficial, one being that it retains water that could otherwise run off and contribute to flooding elsewhere.

Weber says one of the biggest challenges was getting lists of ingredients in proprietary products, such as paints, carpets, and curtains. Companies are very reluctant to provide recipes, but some, as they realize there is a valuable market for products guaranteed to be absolutely safe, can be moved to provide information.

He also points out that Wright Builders has been building a lot of expertise in the LBC standards because it has been simultaneously sourcing products for, and building, the Kern Center and the nearby Hitchcock Center.

Jonathan Wright, CEO of Wright Builders, addressed this, saying "LBC calls the question on where you get everything." To be certified, it is necessary to be able to provide a history of every product used at the site, including a source and the chain of custody. "You have to be well prepared for this," he added. "It pushes the design team to use fewer materials."

"Size matters," Wright also points out. And that was a great benefit for all concerned when two buildings came to be built within a short distance of one another. Purchasing more materials makes it easy to get them economically. A full delivery truck uses not much more fuel than one that is half full. But also, the time and energy spent finding a good material source is as much a matter of economy of scale as purchasing power and economical shipping.

We will continue with more on Wright Builders in an article on the Hitchcock Center for the Environment in G.E.T. Oct issue.

Solar School Incentives IN NEW YORK STATE

K-Solar is part of New York Governor Andrew Cuomo's NY-Sun initiative to make it more feasible for New York State (NYS) school districts to take advantage of solar power. A large part of achieving this goal is to make it more affordable for NYS school districts. K-Solar is a joint project of the New York Power Authority (NYPA) and New York State Energy Research and Development Authority (NYSERDA). The NYS Education Department is also active in the program.

The K-Solar program is provided at no obligation and no cost. It is available to all NYS public schools teaching at levels of kindergarten through 12th grade. In order for a school to participate, it must have a suitable unshaded area for a ground-mounted or rooftop system. The site will probably need to be big enough for a solar array of about 50kW or more, which will occupy an area of about 5,000 square feet.

A school that is qualified to participate should start by contacting the K-Solar program at solar@nypa.gov. The state will begin the process by assessing the grounds to be sure the school has a suitable site.

The site assessment is free, and there is no obligation to participate in the program after having one. If a school has an approved site, it does not mean that the site has to be developed.

If the site is approved and the school decides to go forward, the system will be built by a solar developer, who will own and operate it, typically for twenty to twenty-five years. Electricity from the system is supplied to the school at a reduced rate. This system allows the developer to take federal tax credits, which are only available to people or companies that pay federal taxes. The cost reduction this produces is passed to the schools in lower electricity costs. The savings can be substantial, because the tax credits can offset 50% or more of the system costs.

One nice thing about the K-Solar program is that the output of the solar system is guaranteed. The developer will only charge the school for the electricity it uses, and if that is less than expected, the developer is required to make up the difference in costs. The developer is also responsible for maintenance.

The fact that the state is providing the program to schools means that there are efficiencies in purchasing large quantities of solar panels, mounts, inverters, and other hardware. The costs of having such a system should be considerably lower than the costs of not having one. This makes it a very attractive option for any school with a suitable site.

The NYPA website, www.nypa.gov/k-solar, makes one thing very clear about the K-Solar program. At the bottom of the "about" page, in bold type, it says, "All this at no cost to your district. Moreover, you are not obligated to see the project through to completion and can stop the process at any time."

RESOURCES

350-Vermont: General group that coordinates a variety of statewide actions.
To join this group go to: **groups.google.com/group/350-Vermont**
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
Clean Power Estimator: www.consumerenergycenter.org/renewables/estimator
Consumer Guide to Home Energy Savings, Heating, Appliances, Refrigerator Guide, Building Envelope, Driving: http://aceee.org/consumer
Dept. Public Svc. (CEDF): publicservice.VT.gov/energy/ee_cleanenergyfund.html
Dsireusa.com: www.dsireusa.com Renewables & Efficiency. Find state, local, utility, & federal incentives for renewable energy & energy efficiency.
Efficiency VT: This is a must-go-to site for immeasurable amounts of info. **www.efficiencyVT.com**
Energy Efficiency & R/E Clearinghouse (EREC): eetd.lbl.gov/newsletter/CBS_NL/nl6/Sources.html
Energy Efficiency & Renewable Energy Clearinghouse (EREC): eetd.lbl.gov/newsletter/CBS_NL/nl6/Sources.html
Energy Guide: Unbiased advice about today's energy choices. Find ways to save, lower your bills & help the earth's environment - **www.energyguide.com**
Energy Star Federal Tax Credits: www.energystar.gov/tax credits.
Federal Energy Regulatory Commission (FERC): www.ferc.gov
Federal Energy Regulatory Commission(FERC): www.ferc.gov
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**/
NH Office of Energy and Planning: www.nh.gov/oep/programs/energy/RenewableEnergyIncentives.htm
Renewable Energy World: www.renewableenergyworld.com
Renewable Energy Vermont: www.revermont.org
SEIA/ Solar Energy Industries Association: The SEIA Tax Manual to answer your solar related tax questions. **www.seia.org**
SmartPower: www.smartpower.org
Solar Components: www.solar-components.com
Solar Living Source Book: realgoods.com/solar-living-sourcebook
Solar Power Rocks: Impressive data and info ,including per state. www.solarpowerrocks.com/
Solar Store of Greenfield, MA Stock & install a wide variety of solar & environmentally friendly technologies. **SolarStoreofGreenfield.com**
Tax Incentives Assistance Project (TIAP): www.energytaxincentives.org
The Energy Grid: www.pvwatts.org
The Office of Energy Efficiency & Renewable Energy (EERE): develops & deploys efficient & clean energy technologies that meet our nation's energy needs - **www.eere.energy.gov**
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…

Obsolete technology vs newer innovations. Photo by Aloxe. GNU Free Documentation License.

SILENT WORLD WAR

Cont'd from p.1

The amounts of money involved are almost unimaginable. The twenty-five largest fossil fuel companies have revenues of about $7 trillion annually. That is roughly double the US federal budget, and ten times the budget of the US Defense Department.

Rich as they are, fossil fuel corporations are getting direct government subsidies estimated to be over $500 billion each year. This is happening despite the fact that their damage and operational needs require indirect subsidies estimated at over $1.5 trillion annually.

Clearly, the huge corporations that dig, drill, and break up the Earth have heavy incentives to continue their destructive work. What is not quite so obvious is who will stop them. Nevertheless, a close look tells us they will be stopped, and in the end, the fossil fuel industry's opposition, small as it is, will win.

Despite their seemingly overwhelming advantages, the fossil fuel industry is fighting a battle that has already turned. It is being undermined by efficiency, which alone would put it into recession. It is being opposed politically by many capitalists who once supported it, banks, investors, and insurance companies, all of which are suffering from the damage it does. It is being challenged by new technologies ranging from solar panels to electric vehicles, which give power to ordinary individuals who it once regarded as captive customers. It is being abandoned by its traditional dependent industries, from utilities to car manufacturers, who have found it is possible to save a lot of money by doing without fossil fuels.

Wind power has proven it can supply electricity at a fraction of the cost of coal or nuclear, and at a cost much lower than that of natural gas. Though somewhat more expensive than wind, solar power contracts are being signed at prices below those of conventional natural gas, even when the cost of the solar subsidies is added in. A recent large solar contract in Nevada shows this; the contract was signed at 3.87¢ per kilowatt hour. Renewable power has achieved "grid parity," and the tide is turning against fossil fuels, huge as they are. In the first five months of 2015, 75% of all new US electric capacity was renewable.

The tide is turning, with actual defections within the industry. Shell and BP have gone beyond admitting that climate change is a real, serious problem, and have asked the UN for guidance on how to combat it.

Perhaps the time is in sight, when the carnage of this Silent World War will end.

GUIDE TO ADVERTISERS:

Ingredient of the Month

By Larry Plesant

PRECIOUS PETS

Pets are in the news! And also in our stores, offices, cars, laps, camping grounds and hiking trails. How about some actual straight talk about natural pet products for a change?

Herbal bug repellent sprays last about a half an hour, so actual value may be overstated, unless you get the bonus size. Better still, apply the oil blend onto a bandana and tie it around your pet's neck. Some natural pet companies make special collars and ready-made blends for this. Vermont Soap makes an oil-based Camping Lotion that can be rubbed onto your pet or pet's cloth. The scent lasts about four hours in this form so you have a shot at decent protection with that product.

Pet shampoos often make or imply bug-off claims based on their essential oil scent. Sure, I will bite (pun intended). But the herbal repellent benefits are probably good for only a limited time, say, four to four and a half hours. Keep that in mind if you are going on day-long hikes.

DEET-based products can last longer and thus may work better than herbals in some situations. However, adverse health claims about DEET continue to persist, particularly regarding smaller-body- mass animals and children. As always, the question of safe-nontoxic-natural vs. chemicals is up to the owner's value system.

Aromatic repellents work by ADDLING an insect's sensors. They became confused and act "addled" for a half hour or so before they adjust to it. Presumably you and your pet are long gone by then.

"Hot Spots" or weeping pet eczema is a brutal, painful condition that effects hundreds of thousands of dogs. Several companies make "hot spot" soothing oils including our own Vermont Soap company in Middlebury. (And yes, that statement was an act of completely shameless self- promotion). Treat hot spots with anti-inflammatory herbal salves or herbal oils specifically designed for this heart-wrenchingly painful condition.

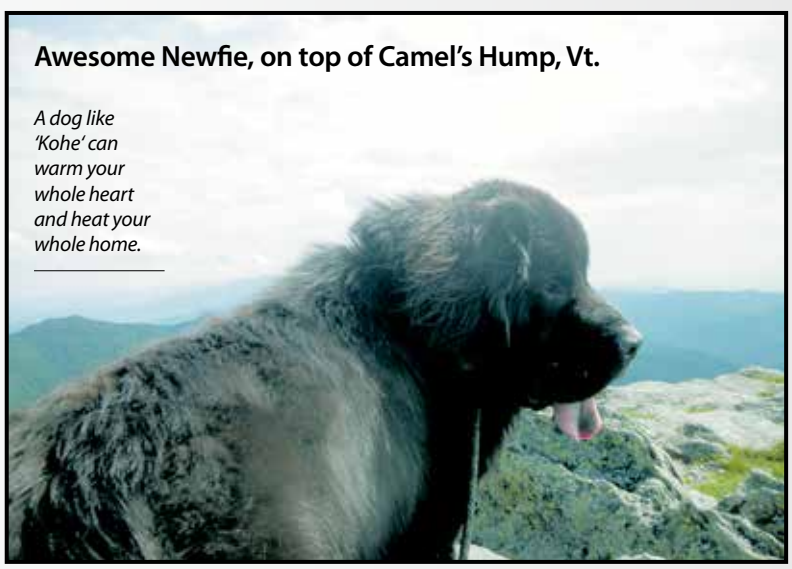
Outdoor summer activities do not have to be a source of anxiety if you use your common sense and your products properly.

This is the Soapman wishing you an enjoyable warm season.

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

Awesome Newfie, on top of Camel's Hump, Vt.

A dog like 'Kohe' can warm your whole heart and heat your whole home.



Good Plastics? Really?

By George Harvey

The cap of this fountain pen was made of galalith, a milk-based plastic invented in the 1890s. At one time, it was one of the least expensive plastics available. Photo by 76Winger. Creative Commons Attribution-Share Alike 2.0 Generic license. Wikimedia Commons.

Deny it or not, most of us really love plastics. They can be inexpensively molded into an enormous number of shapes that would cost a fortune to make any other way. As clingy sheets or zip bags, they keep food fresh and prevent evaporation. Plastic pipes do not decompose easily, plastics insulate electric lines. Everything from toys to car bodies is made with them. They can be easily cleaned. The list of good things about plastics goes on and on and on.

So why do we hate them? Perhaps, it is because they are awful, destructive materials that are used to make things that are junk to begin with, are thrown away too easily, clogging up nature. As they are, their use is unsustainable, and it is clear that to live sustainably we have to get a grip on our love affair with them.

To start with, the plastics we produce are nearly all made from fossil fuels. They are also mostly made with wildly poisonous kinds of chemicals, plasticizers being examples. Most plastics fail do decompose well. Many of them produce dioxin or cyanide if they are burned. A lot of the products made from them have short lifetimes and are used in a culture that was taught that wasting things is good, so they end up in landfills, regardless of recycling programs. When they get into natural environments, a lot of creatures mistake them for food and die because of blockage by indigestible objects. Ocean gyres fill with them, and they are a serious problem for sea fowl that try to feed them to their babies.

One important thing we can do is to stop buying new plastic junk. Another is to insist that food be packaged without plastic; in many cases you can buy bulk food at a food market and put it in your own container (remember to have the store weigh the container and mark the tare weight before you fill it). If you can only afford to buy is an item made of plastic, by all means, get it made of plastic, but buy it used. Otherwise, you are supporting the fossil fuel companies and manufacturers that inflict this junk on us.

Of course, even if we all do those things, it will not eliminate all of the plastics in our lives. I could hardly expect everyone to resort to metal combs and wooden tooth brushes. There are a lot of places that plastics are really needed for one reason or another. But there is good news, even on this front.

Some plastics exist that are not made from fossil fuels, but are entirely composed of natural organic materials found in waste from agricultural and manufacturing processes. Some are even thermoplastics that can be recycled. So yesterday's computer cabinet, originally made of waste from a farm field, could become the dashboard of today's car, and the handles of tomorrow's power drills.

Some plastics exist that are not made from fossil fuels, but are entirely composed of natural organic materials found in waste from agricultural and manufacturing processes. … they can decompose like wood, to the point that small pieces could easily be handled in your compost pile. And if you put them into your fireplace, they burn like wood. … and are priced competitively.

Not only that, they can decompose like wood, to the point that small pieces could easily be handled in your compost pile. And if you put them into your fireplace, they burn like wood. And the icing on the cake is that they are priced competitively.

It happens that one of the most abundant carboniferous materials in nature is lignin, and lignin is the basis of a set of bioplastics.

No one really seems to know exactly how much lignin is produced as a by-product of paper manufacture. Estimates run from about 50 million to 100 million tons per year. Of itself, it is mostly useless stuff, but it can be combined with other waste products, such as straw cellulose, to make thermoplastics that can be injection-molded. Some of them can even be used for 3-D printing. One such product is Arboform, which can be seen at bit.ly/arboform.

Arboform is by no means the only bioplastic. There are others that are made a wide variety of other natural materials, and the plastics seem very familiar. There is a lot of research going into bioplastics, and we will doubtless see more appear.

One thing to bear in mind, however, is that before we celebrate bioplastics as cure-alls, we should understand their true individual natures. The fact that something comes from renewable materials does not mean it is necessarily good for the environment. Each has to be assessed for its environmental impact, including where it came from, what byproducts its production might entail, and where it might go. We would hate to see a baby albatross die because it ate bioplastic trash.

Summer Hiking
in the northeast

A family hiking at Smugglers' Notch Resort. Photo courtesy of Smugglers' Notch Resort.

By Roger Lohr

There's no better way to enjoy the outdoors than hiking on a trail alone or with your friends or family. Whether you are a first time hiker or a walking aficionado, hiking with the family provides quality time together, allows the family to grow closer, develops life-long memories, and introduces the next generation to the outdoors. It's no wonder that nationally more than 34 million people went hiking in the year 2013 and that has remained somewhat consistent in the last few years.

You don't need to walk very far to experience the joys of being outdoors with your kids or grandkids. It's about discovery and having fun. For parents taking their kids on a hike, it is recommended that the child's early experiences be positive, so avoid a fixed goal to reach a favorite spot or the top of the mountain. Keep it simple by being flexible and adaptive to make sure the younger ones have a good time.

Perhaps short hikes at first near home or a local park will provide a positive experience. Bring a snack, water, and invite your kid's playmate. They can find joy in clouds, flowers, tadpoles, splashing water, getting dirty, colorful bugs, etc. but you don't want the kids to get sunburned, hungry, thirsty, or exhausted.

Safety and Other Considerations on a Hike

Be careful of rocks, rubble, brush piles, or fallen logs where kids might lose their footing, sprain an ankle, or take a fall. Tell kids not to drink the stream water or eat berries or mushrooms and the rule with poison ivy, oak, and sumac is "leaves of three, let it be." Be wary of places where bees and wasps might nest.

Wearing bright clothing is a good idea so you are easy to see and find if lost. Layer clothing and be prepared for weather changes. Synthetic clothing (such as a capilene shirt or a pile jacket) is lighter, a good insulator, and dries faster. Socks and supportive boots are important. Traditionally hiking socks were made of heavy wool, but more recently socks are commonly made of a variety of materials that provide warmth, durability and keep your feet dry. Hiking boots are not required but they can help kids feel like an explorer.

A list of items that could be useful on the trail includes: signal device (whistle, mirror), water bottle, emergency blanket, map, compass, flashlight (with spare battery and bulb), extra food, extra clothing, sunglasses, sunblock, insect repellent, knife, waterproof matches, fire-starter or candle and a first aid kit.

If you think that you are lost try to retrace your course rather than continuing on in an effort to reach some destination. An emergency call consists of three short audible or visible calls repeated at regular intervals. Use a whistle for making noise and a mirror or smoke puffs during the day. At night, use a flashlight or small bright fires to signal.

You may consider leaving your dog at home if he or she cannot be kept under control. Respect the privacy of residents that live along the trail unless there is an emergency and you desperately need help.

Leave No Trace

Find full descriptions of hiking destinations in the northeast at xcskiresorts.com/hot-topics.php.

- 1,000 acres of wilderness at Bolton Valley Resort.
- There are over 15 miles of hiking trails at Killington Resort, Vermont's second tallest peak. It offers 360° views of Vermont's Green Mountains, New York's Adirondacks, and New Hampshire's White Mountains.
- Smugglers' Notch Resort creates many opportunities for guided and self-guided hiking for all ages.
- There are over 60 kilometers of wooded hiking trails for all levels of ability at Trapp Family Lodge in Stowe.
- From the Woodstock Inn & Resort, choose from more than 60 miles of interconnected trails and pathways that wind through the Woodstock Village, nearby meadows and woodlands, scenic vistas, and rural countryside.

Additional places to find hiking information for others states are as follows:

- Hike-NH is a great place to find general information on hiking in New Hampshire, primarily in the White Mountain Region. There is a list of 4000 foot peaks, AMC huts system, discussion boards, newsletters, and hiking at hike-nh.com/.
- NY, ME and MA Hikes. Find the best hikes in New York, Maine, and Massachusetts, including detailed trail maps, guides, trail descriptions, Points of Interest (POIs) and GPS tracks/GPX data at EveryTrail.
- The websites per state are: everytrail.com/best/hiking-new-york, everytrail.com/best/hiking-maine, and everytrail.com/best/hiking-massachusetts.

Another very thorough website for hiking in MA can be found at http://1.usa.gov/1rYIUQt.

Happy Trails!

A Walk in the Woods MOVIE

A "Walk in the Woods" on the Appalachian Trail Becomes a Movie

By Roger Lohr

An AMC Outdoors Magazine article referenced the coming movie version of Bill Bryson's 1998 bestselling book "A Walk in the Woods," a comical ill-fated attempt to hike the Appalachian Trail (AT). The recent success of Reese Witherspoon in the movie "Wild" about a woman who hiked on the Pacific Crest Trail brought great popularity to that trail and the entire concept of "thru-hiking," which is an attempt at walking along the entire length of the trail.

In the past year about 2,500 thru-hikers attempted the AT, which runs from Georgia to Maine and a reported 640 completed the trek. The movie "Walk in the Woods" starring Robert Redford and Nick Nolte is expected to increase the number of people hiking the trail to about 4,000 in 2016. Will the trail become overcrowded at overnight sites? Will it get trashed, or impact the fauna and flora?

Stewardship and protection are key aspects of the Appalachian Trail Conservancy, which is calling for more people to reverse their thru-hike experience by starting at the middle and going north before trekking the bottom half of the trail afterward. Much of the issue will be taken care of by natural selection – the fact that within a few hundred miles more than half of the hikers quit the trek. The word is that the first two or three weeks are the test on the more than 2,160 mile journey from Spring Mountain in GA to Katahdin, ME.

The film will be released on Labor Day Weekend.

Source: xcskiresorts.com/hot-topics.php.

SUMMER FUN & YUM

The People's Pint

By George Harvey

The Peoples Pint is a restaurant and brew-pub on Federal Street, in Greenfield, Massachusetts. It is definitely a different sort of place to eat. It gives the feeling of being an upscale brew-pub that takes humorous pride in being subtly funky, but there is more to it than that. Discerning customers quickly find differences from other establishments, but it is hard to imagine anyone finding them all.

Of course, the restaurant's name gives away a tradition of brewing beer. It is produced in their own brewery, and is a matter of much pride. The brewery is not on the restaurant premises, and has been at another location in Greenfield for ten years. Usually, there are a dozen or so types available bottled and two on draft from low-pressure hand-operated taps. Beer, however, is just the start of a lovely story.

Alden Booth, who runs the People's Pint with his wife, Lissa Greenough, says the restaurant's approach to food sets it apart from others in several ways. He says, "Our whole philosophy is to build the meal around the veggies." Considering this, it may be unsurprisingly that some customers habitually think of it as a vegetarian restaurant. But for those of us who really do like meat, it means a different eating experience in which the meat does not dominate the meal. Instead, it is one item among many, all of which are planned for a combination of culinary pleasure and nutrition.

Menu items that are worth mention include great salads, burritos, spicy peanut noodles, green Thai curry with chicken or tofu, "mac & cheese," and local, grass-fed beef. I can tell you I have had burgers made with beef, turkey, and salmon, and they are all hard to beat. Veggie burgers are also available, and I really should try one.

The food has to be local and fresh, if at all possible. Some foods people like are not available when the only way to get them is to bring them in from afar. For example tomatoes are only served when they are locally available and fresh, a very few months each year. Those people who really yearn for a tomato from the Yucatan, picked green for long-distance shipping, to be served hard and flavorless, are usually delightfully surprised to discover that a great salad can be made without them.

Alden and Lissa have a farm with two greenhouses, where much of the food is grown, some of it comes from gardens of employees. Alden says, "The squash you are eating at dinner may have been picked that same morning. You can't get food much fresher than that."

The People's Pint has followed an aggressive policies for many years on dealing with waste. All of the food scraps are composted. All of the paper, glass, metal, and plastic (of which there is very little) is recycled. Alden says that in the time the restaurant has run, there has never been more than one trash can of waste generated on even the busiest of days. For a restaurant, with a lot of people going through, that says a lot.

The restaurant is socially engaged. Since 2003, they have been very active in promoting bicycling, donating 25% of the profits from their Training Wheels IPA to MassBike, and giving gift certificates to people who bike instead of driving cars. They offer gift certificates to those who switch from disposable diapers to use a linen and diaper service. They accept R Credits, a local currency.

The People's Pint is on Federal Street in Greenfield. The phone number is (413)773-0333, and the web site is www.thepeoplespint.com.

Good locally grown and raised food with home brew means 'fun and yum' at the People's Pint. *Photos from the gallery at www.thePeoplesPint.com*

Interiors green Shots!
THE HOME AND LIVING STORE

Imagine this ... Painting with Milk!

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

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

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

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

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

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

Mixing natural milk paint. Photo by William Grandordy: public domain.

Today the milk paint company is run by Thibeau's daughter, Anne, and there are over 400 dealers worldwide selling Old Fashioned Milk Paint and the company's newer SafePaint wall formula; among the dealers is Interiors Green at 2021 Main Street in Bethlehem, NH.

Jessica Barber Goldblatt is the owner of Interiors Green -- the Home and Living Store. www.interiorsgreen.com.

Ask the Soapman

Dear Soapman,
I heard melaleuca oil is good for my skin. Do you make any products containing it?

The Truth Behind Melaleuca Oil
There have been some new health and beauty products that have hit the market with melaleuca oil as the featured ingredient. But guess what; Melaleuca Oil is simply a fancy name for Tea Tree Oil! Tea Tree Oil is an excellent natural antiseptic and we have ***LOTS*** of products with Tea Tree Oil in them: Bar Soap, Foaming Hand Soap, Shower Gel, Castile Liquid Soap, Air Fresh Aromatherapy Spray and Pedifix FungaSoap - No need to pay extra for a fancy name! Vermont Soap has the natural products you want a price you can afford. Our Mission is to replace yucky stuff with yummy stuff. Check out our full line of personal and household cleaner at vermontsoap.com

All the Best,
Soapman

SHOPPING FOR Greener Furniture

By Roddy Scheer and Doug Moss

Due to increased consumer awareness and demand, there are more "green" choices in furniture available than ever before. Pictured is a Savvy Rest organic crib mattress distributed by Furnature. Photo courtesy of Savvy Rest.

While we now opt often for greener cars, appliances, household cleaners and food to up the sustainability quotient of our lifestyles, the furniture we spend all day and night in close contact with is often far from eco-friendly. The vast majority of sofas, chairs, beds and other upholstered furniture we love to lounge on contain potentially carcinogenic formaldehyde or toxic flame retardants and stain resistors that have been linked to developmental and hormonal maladies. And much of the wood used in desks, chairs, tables and the like (as well as in the frames of upholstered furniture) comes from unsustainably harvested lumber which contributes to the deforestation of tropical rainforests.

But today, thanks to increased consumer awareness and demand, there are more "green" choices in furniture available than ever before. A good place to start the search for that perfect couch or chair is the website of the Sustainable Furniture Council (SFC), a non-profit formed in 2006 to help develop solid standards and certification processes within the home furnishings industry. The organization has become a leading information source and network of some 400 green furniture makers and related retailers, suppliers and designers as well as other non-profits. Consumers looking for greener furniture can browse SFC's membership list which features contact information and website links accordingly. Buyers beware: Just because a furniture maker is listed with SFC doesn't mean it eschews all chemicals or unsustainably harvested wood entirely, but only that it is making strides in that direction. Consumers should still be knowledgeable about which green features they are looking for or which kinds of materials to avoid.

Of course, with something like furniture you really need to see and feel it in order to decide whether it will work in your space. Eco-conscious consumers making the rounds at local furniture stores should keep a few key questions in mind for salespeople. Does the piece in question contain formaldehyde, flame retardants or stain resistant sprays? Is the fabric used certified under the Global Organic Textile Standard program (GOTS, which mandates that at least 70% of fibers are derived from organic sources and do not contain chemical dyes or other additives)? Is the wood used certified by the Forest Stewardship Council (FSC) as sustainably harvested? Does the piece contain any parts or pieces that come from bamboo or reclaimed wood or recycled metal or plastic? And is it easy to disassemble into reusable or recyclable parts if it needs to be replaced down the line?

If the salesperson doesn't know the answers, chances are the piece does not pass environmental muster. Limiting your search to stores and Internet-based retailers that specialize in green products is one way to reduce the amount of research and self-education needed, especially because salespeople in such vendors are usually up-to-speed on the latest and greatest in sustainable furnishings. Some leading national furniture chains that carry a sizeable inventory of sustainable goods include Crate and Barrel, Room and Board and West Elm, but many more single store eco-friendly furniture stores exist across the country. Some leading online green furniture retailers include Eco-Friendly Modern Living, Furnature, InMod, Mitchell Gold + Bob Williams, SmartDeco, Southcone and Viesso.

Contacts: SFC, www.sustainablefurnishings.org; FSC, www.fsc.org; GOTS, www.global-standard.org; Eco-Friendly Modern Living, www.eco-friendlymodernliving.com; Furnature, www.furnature.com; InMod, www.inmod.com; Mitchell Gold + Bob Williams, www.mgbwhome.com; SmartDeco, www.smartdecofurniture.com; Southcone, www.southcone.com; Viesso, www.viesso.com.

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80,000 CHEMICALS

A video from the NY Times (May 3rd) that discusses a thorough history of the over 80,000 chemicals in use today - with many of the health menaces. It is a must watch!

The link is: http://nyti.ms/1OVO7ar

Green Tips

>> The energy saved by recycling one glass bottle can light a 100-watt light bulb for four hours or run a computer for 30 minutes.

>> If we recycled all of our aluminum cans for one year, we could save enough energy to light Washington, D.C. for 3.7 years.