Montpelier, Vermont ... is doing it!

Net-zero Capital’s Goal in Sight

The New Hampshire House of Representatives has voted in favor of a budget that would raid $51 million of funding from New Hampshire’s renewable energy fund to close a general-fund budget gap. This move flies in the face of broadly supported, bipartisan clean energy policies that have supported hundreds of solar jobs in New Hampshire and brought millions of dollars of private investment into the state.

This potentially disastrous move comes just as New Hampshire’s renewable policy was showing signs of progress — several bills attacking the Renewable Portfolio Standard have been defeated this session, and the Governor’s budget left the renewable energy funds alone completely and balanced the budget using more responsible tools.

The raid on renewable energy funds to plug holes elsewhere in the budget is not unprecedented in New Hampshire — previously over $16 million has been raided — but the amount the House has suggested is a whole other order of magnitude. Should this move be allowed to take place, it would wipe out all renewable energy rebates in the Granite State.

The New Hampshire Sustainability Energy Association makes no words, stating that the House budget would have “devastating effects on our economy, threatening thousands of jobs and depriving towns and businesses of much-needed assistance to lower their energy costs, lower local property taxes, and keep our energy dollars here in NH’s economy.

House leadership has turned its back on its own public pledge to create a sensible budget for NH without raiding dedicated funds, using accounting gimmicks, or by raising new taxes. Raiding the dedicated renewable energy fund will strip ratepayer funds intended for cost-saving and job-creating energy projects, thereby creating a hidden energy tax.”

By George Harvey

Communities develop where there are resources for their economies. In general, greater resources mean larger or more prosperous communities. Historically, the resources included available water for running mills, forests, mines, roads, and ports or landings, and many others.

The early 19th century saw communities develop along canals as they were constructed, and later the same thing happened along railroads, wherever there were stations. The 20th century extended this as access to superhighways, high-voltage power lines, and natural gas pipelines attracted growing businesses. Whether you like these things or not, they drove economic development.

Today, the world is changing in ways many of us could not have imagined only a few years ago. The whole idea of climate change is rather new to nearly all of us.

The experiences of tropical storms Irene and Sandy point to more difficult weather ahead. And it is not merely a handful of alarmists who are sounding out on this. Scientists from NASA and NOAA who speak out are unanimous in calling climate change a serious problem. The US military says climate change is a number one security threat for our nation.

There is good news however. Communities can do something about climate change on their own. And interestingly, this can provide not only security for power for all communities of all sizes, but also a set of economic tools for developing a more stable and resilient local economy.

The fact that with proper implementation, this can reduce costs for everyone while reducing environmental damage is a pleasant bonus.

One of the most important of those tools is the microgrid, an electrical system that can potentially stand alone and be self-reliant. A microgrid includes generating capacity of some sort, backup power, and the various other equipment needed to power our electric demand. Those of us who live off-grid already have their own microgrids, typically single home structures with solar panels, battery backup, possibly a backup generator, and whatever inverters and controls are necessary to do the job.

Grid-tied microgrids are common. They are used at hospitals, emergency shelters, police and fire stations, the secure areas of all military installations, and even some apartment buildings. The main difference from an off-grid system is that the grid-tied microgrid has to have a set of switches and other equipment to detach it.

Montpelier, largely under the leadership of the volunteer Montpelier Energy Advisory Committee (MEAC) is engaged in a multi-pronged effort. It is attempting to mobilize resources, inspire behavior change and motivate Montpelier-ites to invest in fossil fuel-reducing solutions to meet our ambitious goal. MEAC has divided our strategies into different areas of energy use: heating, electric generation and transportation. We are even tentatively exploring a much more difficult issue — be energy independent!

Thank you to Our SPONSORS For Their Support:
APRIL TWENTY-SECOND
Earth Day – Past and Present

By Green Energy Times staff
Each year, Earth Day is celebrated on April 22nd. This year marks the anniversary of what many consider the birth of the modern day environmental movement. Gaylord Nelson, then a U.S. Senator from Wisconsin, created the idea of Earth Day after the disaster of the 1969 massive oil spill in Santa Barbara, California. Inspired by the anti-war movement, he realized that the same energy were placed towards environmental consciousness, environmental protection issues could be accepted at the national level. Senator Nelson declared the first Earth Day in the U.S. on April 22, 1970. It was a huge success. By 1990, Earth Day went global with over 141 countries participating. More than one billion people now participate in Earth Day activities each year. It is observed in 192 countries and coordinated by the non-profit Earth Day Network, chaired by the first Earth Day organizer Dennis Hayes. Hayes declares Earth Day as “the largest secular holiday in the world.” This year for the Earth Day campaign is "It’s our turn to lead." Green Energy Times provides information to help you take the lead in your community in preserving the Earth. We hope you participate in one of the many Earth Day celebrations on April 22nd and maintain this energy throughout the year to help secure a healthy future for ourselves, our children, and the planet. More information can be found at the Earth Day Network website: http://www.earthday.org/.

ABOUT G.E.T.

Green Energy Times is produced by 100% solar power, off-grid with a 3.8 KW PV system. We live and know that Energy Independence is indeed possible – with clean, sustainable renewable energy along with reducing emissions. We walk the talk!

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

Solar Power works... anywhere under the sun! G.E.T. is published bi-monthly, Feb, Apr, 15th, Jun, Aug, 15th, Oct, & Dec, by NGO Advisory Company. It is free and available throughout 95% of VT & 80% of NH. It is published in a totally green manner, thus increasing carbon footprint a bit lower. Hopefully our footprint is offset through green energy with renewable energy and carbon offsets for the distribution emissions are also kept to a minimum, as well. With the helpful information sent to us, we are able to learn and share.

Distribution: Roselye Moore, Mona Sweat, George Plumb, Bill Pearson, Marty Philbrick, Larry Finsat, Jessica Goldblatt, Deb Duflohead, Michael Clark, Larry Chase, Doug Landry, Cynthia Webster, Hippo Distribution, Manchester, NH. Hopefully we have not forgotten to mention anyone. It’s nice to know that we have gone one step further to use a way of a sustainable planet, starting here in the northeast!

Thank you all for your help!

KEEPING IT LOCAL KEEPING IT GREEN

Green Up Vermont

By Michelle Harrison, G.E.T. Staff Writer
Help keep Vermont clean and green! Take part in Green Up Day on May 2nd. This event is a unique Vermont tradition bringing people together in their communities statewide to clean up road side litter. Since 1970, the first Saturday in May has been designated as Green Up Day. It was started by Governor Deane C. Davis. In 1979, Green Up became a nonprofit organization. Over 20,000 people volunteer annually in picking up litter on Green Up Day. Over 40,000 bags of trash are collected annually. Green Up Day is mainly about picking up litter, but many communities provide refreshments, breakfast, a picnic lunch, barbecue dinner, and even live music and entertainment. We walk the talk and come out and join the community. Get involved. Find out how your community is participating and where to pick up bags. Make a difference for Vermont by/VT-make-a-difference.

Green Up Vermont is a nonprofit organization whose mission is to promote the stewardship of Vermont’s natural landscape and waterways and the livability of its communities by involving people in Green Up Day and raising public awareness about the benefits of a litter-free environment. Learn more at greenupvermont.org or 802-229-4586.

IN OUR APRIL 15TH ISSUE: It’s our Six (6) Year Anniversary! This issue is full of ways to accomplish just that. This is the year to make it happen!

THE POWER OF COMMUNITY: We have focused on:
1) the city of Montpelier, VT, whose goal is to be the 1st net-zero capital in the country. This goal includes energy independence, as well as meeting other important needs such as heating and food, on a community scale as well as individual needs. We are sure that the non-profits that we have covered this year have covered since it just over one year ago – last April 15, 2014.
2) We are also sharing what is quietly happening in the town of Plymouth, NH. This rural community of under 8,000 people is simply amazing. We only touched on a portion of their achievements! See pp. 10-11.

Be sure to read about Burlington and Rutland, VT in this issue. In June, look for coverage of another amazing community in MA: Greenfield Center. Guess you’ll have to wait to see who else we are planning to talk about in future issues of G.E.T. If you think we’d like to know about what your town is doing, email us at: info@greenenergytimes.org or give us a call at 802.439.6675.

You will likely notice that our center spread is introducing you all to New York. The time has come “Bring G.E.T. to NY”. Expect to read much more about what is going on over across the border. They want to not follow our example, but to become the example! Well, the end of winter is approaching, and spring has officially sprung.

Happy Spring to All! ~ Nancy Rae

TO OUR SPONSORS:


2015 Green Up Vermont logo designed by Ariana’s, grade 11, Montpelier High School. Photo Courtesy of Green Up Vermont.

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When the main grid loses power, without which safety issues would arise in general power failures. A community microgrid is more extensive. Systems large enough to supply entire neighborhoods or towns already exist, but are only commonly found on military bases. Such systems continue to operate when the main grid is without power, and local disruptions usually can be addressed quickly by local crews.

Those community-scale microgrids that are powered by renewable generation sources have the additional feature that they do not need to have fuel delivered, and so can operate indefinitely in the event of a grid failure. The advantages to a community of having its own microgrid are enormous. The fact that a community can continue operation in the event of large-scale power outages is attractive to anyone who might need to have a very reliable power source. Banks, data centers, brokerages, gas stations, restaurants, hotels, and all sorts of other businesses can benefit from such a system. This is something a community can use to attract investment; it is an economic tool.

Interestingly, even if we could know that the grid would never fail in a particular area, there can be benefits of renewable-powered microgrids. The local generating equipment can supply much or all of the power to the microgrid, even when it is attached to the main grid. This means that equipment installed for power supply resilience also functions to keep the money paid for power within the community. In a community of sufficient size, this will create employment and investment opportunities of its own. This is a second economic tool. If the microgrid is community-owned, then its profits could be used to lower taxes or pay for services. If the microgrid is investor-owned, then it will pay taxes, and if the investors are local then the profits stay in the community. In either case, the microgrid is a component of another economic tool.

While the problem of global warming is global, some of the best solutions to the problem need to be implemented locally. Interestingly, some of those solutions can also help ensure the long-term prosperity of those communities that implement them.
EV Charging Equipment Rebates in NH

The New Hampshire Department of Environmental Services (NHDES) and the Granite State Clean Cities Coalition announce the availability of rebates to support the new installation of new electric vehicle supply equipment (EVSE) in New Hampshire. Motor vehicles produce the majority of the air pollution in New Hampshire that leads to smog and unhealthy air quality. Plug-in electric vehicles (EVs) reduce those emissions through use of cleaner energy from our regional electric supply. The number of EVs in New Hampshire and the region is increasing rapidly. This EVSE rebate program will enable the development of an EV charging network in the state that will be available to New Hampshire residents and businesses, as well as to those who visit our state for business or to take advantage of our many recreational and cultural opportunities.

The rebate program is designed to support development of EVSE at strategic locations to enable operation of EVs throughout New Hampshire and connect to charging corridors in neighboring states. Targeted areas of deployment include Interstate highways and other major transportation corridors, as well as key destinations such as tourist attractions, large retail centers and large employment centers. For more information visit des.nh.gov.


EV FINANCING IS AVAILABLE in VERMONT

The VT State Infrastructure Bank administered by the VEDA (Vermont Economic Development Authority) is offering loans to qualified buyers. With 10% down and a 1% interest rate, the repayment period (based on equipment life) is typically up to 10 years. Learn more at www.driveelectricvt.com/chargingloan.

Drive Electric Vermont also shares helpful information regarding Electric Vehicles such as Vermont Electric Vehicle Charging Locations and Pricing, Types of EVs, Types of Charging, Financing, an Installation Guide and much more. Their website is www.driveelectricvt.com.

The U.S. Department of Energy offers an Alternative Fuels Data Center where you can find information about EV’s that includes electricity basics, benefits and considerations, how to conserve fuels, locate stations, laws and incentives, infrastructure development, charging at home, in multi-use dwellings, and in public. For this info, visit www.afdc.energy.gov/fuels/electricity_infrastructure.html#level2.

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www.GerrishHonda.com
Bikes Make Sense

By George Harvey

The cost of owning cars varies enormously. Factors include the price of the car, the cost of financing it, its age, how well it is maintained, insurance, where you park it, how you drive it, cost of fuel consumed, and registration fees.

Points that are not obvious include things like how much time the car spends idling, and how aggressively it is driven. These two factors alone can shorten the reliable lifetime of the car by as much as 50%. (Ask your town manager about the life expectancy of police cruisers.)

The American Automobile Association estimates the cost of owning a car each year. Right now, costs are about as low as we might expect them to get, because of the price of gas. Even so, reducing the AAA’s estimate for car ownership in 2014 to compensate for the difference, we get these average costs for car ownership:

- Small Sedan ________ $5993 per year
- Medium Sedan ________ $7615 per year
- Large Sedan ________ $9330 per year
- SUV ________________ $9510 per year

If you think this is a lot, you might want to consider the other costs that AAA did not include in their calculations. We will mention some, and you can tally what you think they are worth to you. A certain Mr. Q. provided us with his evaluations.

◊ How much does parking cost? Many urban apartment dwellers pay over $250 per month for their parking places. Mr. Q. gets, who gets parking with his apartment, considers it to be worth 5% of his rent, making it $50 per month, or $600 per year.

◊ How much is it worth to feel fit? You could pay $50 per month to a health club. Biking and walking reduce body fat, increase endurance, strength, and agility, saving you that amount. Mr. Q. is rather lazy, however, and would not use a gym, so he adds a $0 annual cost.

◊ How much is it worth to avoid medical costs? Exercise reduces likelihood of heart disease, high blood pressure, stroke, colon cancer, breast cancers, diabetes, osteoporosis. Would we pay $75 per month for that, perhaps? Mr. Q. agrees, and adds $900 per year.

◊ What about the value of a sense of well-being, and reduced levels of stress and depression, and even a reduced possibility of dementia. Mr. Q. (who looking surprised at being asked what he would pay to avoid dementia) says it would be as valuable as a vacation, another $1200 per year. (We inform him that he may not change his answer to question 2.)

◊ A recent study says adding the environmental costs to the price of gasoline would raise it by $3.75 per gallon. For Mr. Q.’s car, which uses 500 gallons per year, so that adds $1875 to the annual cost of car ownership.

Assuming that a bike costs $500, gets $25 in maintenance each year, and lasts ten years, its cost is $75 per year. We reduce the savings of giving up a car accordingly. Mr. Q., who drives a mid-size sedan, could save $12,115 per year by biking and walking instead.

Clearly there are some people who cannot just drive a bike. They might benefit from considering ride shares. Many have no easy way of giving up a car. Our editor, who lives far out of town on dirt roads, making winter snow and mud season difficult, and who has to transport thousands of papers at a time does ride bikes all over the countryside, including an electric bike powered entirely by solar PVs, but her car is a necessity, at times. For such people, the only thing that makes sense for now is to keep a car that is worth the cost.

But for many, the question is, what would you be willing to do for $12,000 per year? Would you give up the car and bike or walk? Mr. Q. has a slightly-above-average savings of $12,115 per year, which he believes is really good pay for not being lazy. We will keep tabs.

Critical Mass biking event in San Francisco. This event takes place in hundreds of cities worldwide, each month. Photo by mwparenteau, from Wikimedia Commons.
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 “GoVermont” for statewide choices to travel more efficiently. Whether getting around town, commuting to work or school, or planning a day trip, share the driving or ride with someone else to help save our planet and to save approx. $2,000 annually. The statewide VT site also lists services for commuters, tourist, and shoppers.

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

When carpooling, remember to use the local Park n Ride lots to meet your connections. Start your trip planning at connectingcomputers.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

CARRILO COUNTY TRANSIT - Services and connections to Belknap County. 888-997-2020 tccap.org/nc1.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 concordareatranst.org

CONTOOCOOK VALLEY TRANSPORTATION (CVC) - Monadnock Rideshare for the southwestern region 877-428-2882 cvt-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 TRANSPORT AUTHORITY (MTA) - Manchester, with links to Nashua and Concord. 603-623-8801 mtabuses.org/services/local-buses

NASHUA TRANSIT SYSTEM (NTS) - Buses and trolleys with bike racks. 603-888-0100 Ride4Blue.com

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

IN VERMONT

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

VERMONT PUBLIC TRANSPORTATION PUBLIC TRANSIT - Lists transit, ferries and more at aast.state.vt.us/Public/Transit/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. cvtc-nh.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. rail vt.com

GREEN MOUNTAIN TRANSPORT AGENCY - Local service in Barre, Montpelier, Grand Isle, Stowe and Lamoille. 802-223-7287 gmart.deerfield.com

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

LAKE CHAMPLAIN FERRIES - Transport between New York and Vermont via Lake Champlain. 802-640-9004 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 ridgetr.com

STAGE COACH - Commuter buses from Randolph and Fairlee to Dartmouth, local village buses. 800-437-3533 stagecoachrides.org

NEW & IMPROVED ALL COMMUTER RESOURCES IN ONE PLACE

We all know there are many transportation choices in the Upper Valley, but sometimes it’s not easy to find them. Now a new UV Comuter Portal has all the resources commutes want in one place.

Located on the Upper Valley Rideshare website, you’ll find Carpool Matching and Benefit Tools, Transit Schedules, Bike & Walk Trails, Park & Ride Location Finder, Transportation Experts and Advocacy and more. By collecting all the resource links on one page, it is easy and quick to find information without having to hunt for resources. Each transportation provider maintains and updates its own data, so the links always bring you to the most current information.

The UV Comuter Portal can be accessed by Smart phone, tablet, or computer. It is a component of the RT1 RT20 Corridor traffic project that is going on now. Find the Portal at www.UpperValleyRideshare.com/commute-portal/ to find a new commute!

For information call 802-295-1824 x208 or e-mail sberry@uppervalleyrideshare.com.

The Portal is a product of the 2014 RT1 RT20 Corridor Workgroup sessions.

IDLE-FREE VT INC.

ENVIRONMENTAL COURT RULES IDLING TRUCKS IN VIOLATION

By Wayne Michaud

Residents of an East Hardwick, Vermont neighborhood that endured and then fought the pollution and noise of heavy-duty truck idling daily in a Compact Residential zoning district for nearly nine years won a Notice of Violation (NOV) judgment order from the State of Vermont Superior Court Environmental Division on March 4, 2015 that effectively prohibits a trucking company from continuing operation of commercial truck tractors in that district.

John Mandeville, an appellant in the case, following issuance of judgment, stated, “…the whole neighborhood is over that we were successful in our case before the Environmental Court and, as a result, we will get our nice, quiet village back.”

A summary of the facts in the case is as follows:

A trucking company has owned property in an East Hardwick Compact Residential neighborhood since 2006, with two trucking-related businesses registered at their address. Residents of two properties, who are the appellants in the case, are located next to and across the street from the trucking company. The trucking company operates a quiet neighborhood of residential dwellings.

The trucking company has had two diesel-powered commercial truck tractors (that pull trailers) stored on their property, registered at their address. Residents of the neighborhood have complained to the trucking company from continuing operation of commercial truck tractors in that district.

The Environmental Court judgment overturned a Town of Hardwick Development Review Board determination in favor of the trucking company, ruling that they were not in compliance with Town Bylaws; the Town intends to abide by the court’s decision.

In the wake of this case, it is important to note that (1) engine manufacturers and experts in the trucking industry make it clear that prolonged idling is rarely necessary and (2) continued exposure to vehicle exhaust chemicals, particularly from heavy-duty vehicles, is harmful to human health. Children and the elderly are most vulnerable. These exhaust chemicals can cause cancer and respiratory illness such as asthma; Vermont has elevated levels of asthma.

Idle-Free VT Inc. is a 501C3 nonprofit organization with a goal of raising awareness of unnecessary vehicle idling in Vermont primarily through education. It also encourages adoption of policies and procedures, and enactment of laws, to limit vehicle idling.

Wayne Michaud is the Director, Idle-Free VT Inc., 802-453-5857; info@idlefreevt.org; idlefreevt.org

The U.S. Environmental Protection Agency (EPA) has identified 21 chemicals in bus and truck exhaust that are known or suspected to cause cancer or other serious health effects. These include chemicals such as benzene, formaldehyde, acetaldehyde and 1,3 butadiene.
Vermont Solar Farm Wins 2015 Project of Distinction Award

Green Mountain Power and groSolar have been awarded the 2015 Project of Distinction Award for the Stafford Hill Solar Farm in Rutland, by the Solar Energy Industries Association (SEIA) and Solar Electric Power Association (SEPA). The award was presented at PV America, an annual trade show and conference in Boston, MA, that is designed to serve and advance the solar PV market by bringing together industry professionals. The award celebrates a major milestone for the Northeastern solar market and recognizes the highest achievement for a PV solar energy project of any scale.

“SEIA and SEPA commend the recipients of this year’s Project of Distinction award, groSolar and Green Mountain Power,” said Rhone Resch, CEO and President of SEIA. “Together, and with their partners, they have developed and constructed a very innovative project in Rutland that will provide power to thousands of homes, along with a storage component to power a shelter in the event of power outages. It’s projects like this that will continue to help grow the solar industry, and awareness, nationwide with such innovation and cutting-edge technology.”

Stafford Hill is an exciting new project designed to improve resiliency and safety in communities by generating solar energy that can be stored and used to power an emergency shelter at Rutland High School in the event of weather-related power outages. According to the U.S. Department of Energy, the Stafford Hill Solar Farm is the first project to establish a micro-grid powered solely by solar and battery storage, with no fossil fuels. The project also utilizes land atop a closed landfill, which was otherwise unsuitable for development.

“We are very honored by this award and thank SEIA and SEPA for this acknowledgment,” said Green Mountain President and CEO Mary Powell. “Stafford Hill is a terrific example of how, working together, we can transform space that would otherwise be unusable into something that is critical to the community in times of need. This project will power the city’s emergency shelter during storms, providing peace of mind to the people of Rutland.”

The project, engineered and built by groSolar, which has offices in White River Junction and Rutland, Vermont, consists of 7,700 solar panels capable of generating two megawatts (MW) of electricity, enough to power as many as 2,000 homes. The system includes four MW of battery storage, including emergency power for the nearby emergency shelter.

“We're thrilled to have this project recognized for its national significance and are confident it will lead to similar applications elsewhere. Partnering with Green Mountain Power to develop and build this innovative system is a huge feather in our cap and we are grateful for the recognition from the folks at SEIA and SEPA,” said groSolar CEO Jamie Resor. “Completing this project and receiving this award wouldn’t have been possible without everyone who was involved in this partnership. It’s exciting to see the PV industry grow and mature in Vermont and elsewhere.”

Stafford Hill is another important step in the partnership to establish Rutland as the “Energy City of the Future,” where GMP pilots new technology to empower customers to lower their energy costs by using less energy while improving the comfort of their homes. This project also represents progress towards the goal of making Rutland City the “Solar Capital of New England.”

“The quality of the partnership between the city, GMP, and groSolar on this project is unprecedented,” Rutland Mayor Christopher Louras said. “It is the epitome of good collaboration, with wins for everyone involved.”

Dynapower of South Burlington designed special equipment for the project and the Clean Energy States Alliance helped secure funding from the U.S. Department of Energy along with grant contributions from the Vermont Clean Energy Development Fund.

The $10 million solar and battery storage project is set to be completed in May.

For more information on PV America visit: http://www.pvamericaexpo.com/. To learn more about Stafford Hill and other energy projects from Green Mountain Power, visit www.greenmountainpower.com, and find out more about groSolar, including its services and project portfolio, please visit www.grosolar.com

Final commissioning of the Stafford solar project is expected in June once all battery storage and controls are fully tested. Photo: Green Mountain Power.
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Net-zero Capital Goal in Sight

Cont’d from p.1

of how possibly to transform our housing density, since dense, walkable cities are much more energy efficient.

We have done a lot – but we have much more to do. And, we have a track record upon which to build, as this journey didn’t start last year. It started over a decade ago with the concept of a district heating plant. It grew through the effort of our local energy teams, who knocked on doors promoting energy efficiency, and surveyed city buildings and businesses for efficiency modifications.

In 2010, after the successful procurement of a DOE grant to support a local biomass district heat system, our energy advisory committee was mandated by the city council to oversee the process. The district heat system will replace about 300,000 gallons of oil per year, which now costs almost a million dollars. Using regionally-sourced wood chips along with local maintenance services, the project is also keeping dollars working locally. I am proud to report that this innovative project started delivering heat to state and city offices and to some downtown businesses in fall of 2014. Reports of our initial customers are glowing in terms of its reliability and realized savings.

There are other efforts afoot, too. Montpelier is now completing negotiations for 1 MW Solar PV which will cover over 70% of the city’s municipal electric consumption, likely at a 15% savings.

Montpelier is also gaining in other ways from our commitment to become net zero. Recently the Department of Energy and the White House recognized our city as one of 16 Climate Action Cities in the country. This will give us a leg up in mobilizing Federal resources. We are also one of the nation’s 50 finalist competitors for the Georgetown University Energy Prize.

As we have matured and accomplished more, people from around the state have noted how lucky we are to have this committee, composed of knowledgeable and committed cadre of volunteers, have been essential. But, again, there is much more to do.

Getting homes and apartment buildings in the efficiency mix is somewhat harder. Since 2006, according to Efficiency Vermont, over 500 Montpelier homes (that’s 15%) have completed some level of weatherization work. Our energy committee is now in an intensive strategic planning effort to address the big energy demands of residential users and the whole transportation mix. For all of us, this work is the hardest because there are few easy, convenient alternatives.

Our big advantages going forward will be our small size. At 8,000 people we are able to move more quickly than larger political institutions, and there is an obvious benefit to being the capitol city of Vermont. Our population doubles mid-day, which brings vibrancy and resources to our local economy. Our very healthy commercial sector is quite supportive of the energy work, especially the savings now being realized from the district heat plant.

Montpelier is also gaining in other ways from our commitment to become net zero. Recently the Department of Energy and the White House recognized our city as one of 16 Climate Action Cities in the country. This will give us a leg up in mobilizing Federal resources. We are also one of the nation’s 50 finalist competitors for the Georgetown University Energy Prize.

We can boast many tangible results for a small city with such a forward looking commitment. There is much more real, hard work to do. But, if the next few years manifest anything close to the progress we have made to date, I believe it is quite possible for capitol of Vermont to be net-zero by 2030.

There is so much happening in Montpelier. Stay tuned for updates in future issues of Green Energy Times – as this city becomes the first fossil-fuel-free, net-zero capital in the country.

Dan Jones is the former chair of the Montpelier Energy Advisory Committee.
In the pursuit of community resilience, one of the most active communities in New England is unquestionably Plymouth, New Hampshire. The Plymouth Area Renewable Energy Initiative (PAREI) is a leading organization in this pursuit. Co-Director Sandra Jones says, “PAREI’s goal is for every resident in the town to consider the issue of energy when making small and big decisions at home and at work. All we ask is that people ‘just think about it, think about how you choose to use energy and when you do choose to use it, take a minute to appreciate it.’ We believe this very exercise leads to constructive change.”

Considering the number of projects we are seeing along with PAREI’s help, it seems clear that approach is working. Plymouth’s population is about 7,500, including a few hundred college students. Despite the town’s small size, a lot has been happening.

The latest numbers: a total of 24 solar photovoltaic (PV) systems with 101 KW of total nameplate capacity getting rebates in Plymouth. The total cost of facilities is $412k. PVs have been installed on the Pease Public Library and the Plymouth Elementary School. The town is also planning a solar PV array at the municipal recycling center.

A number of individuals are heavily involved. Dick Flanders is one of the town’s early adopters. He has been keeping track of his energy usage since the 1970s. Today, he has a solar thermal system installed by PAREI. He also has 4.59 kilowatts of solar PVs, which he calculates will have a payback time of a bit over twelve years. His other resilience efforts include large vegetable gardens at his home.

Steve Whitman and his family are restoring a late Victorian homestead, making the property a model permaculture project. They want to reduce their ecological footprint and have a positive environmental impact. Their improvements include insulation, air-sealing, an improved heating system with computer controls, and a composting toilet. Their upgrades use locally milled lumber, clay plaster, non-VOC coatings, and locally manufactured cabinets. They have worked to repair their soil and built gardens with a view to food security, habitat care, and consideration for pollinators.

The New Hampshire Electric Cooperative (NHEC) is working with Plymouth to upgrade its streetlights. The program began in 2012 and is aimed at increasing both efficiency and effectiveness of the lights. High pressure sodium streetlights are being replaced with new LED lights. Unnecessary or redundant lighting is being removed altogether. The project will continue in phases with remaining downtown and outlying areas scheduled for conversion by 2016.

We should note that the NHEC recently voted on a new net-meter cap. They raised the cap to 3.4 MW from the previous 3.16 MW because it was already oversubscribed at 3.24 MW. The NHEC decided on their own to do this; kudos to the NHEC.

Weatherization has not been neglected in Plymouth. The town is one of three New Hampshire communities chosen to participate in the Better Buildings program. This is a three-year grant-funded program undertaken by the town with help from the New Hampshire Office of Energy and Planning and the New Hampshire Community Development Finance Authority. Its purpose is to provide resources and financing for energy efficiency upgrades on commercial, industrial, municipal and residential buildings. Over the life of the program, Better Buildings helped oversee 36 residential and 21 commercial weatherization projects within Plymouth with an estimated annual cost savings of over $96,000 on participant’s energy bills.

Plymouth is providing an example other communities might follow to their own benefit.
Oldies ...but Goodies
A Recap of Stories about Plymouth from Past Issues of Green Energy Times

Plymouth water and sewer array, February 2015

A new solar array belonging to the Plymouth Village Water and Sewer District began producing power in December of 2014. It was built with the help of a coalition of a large number of people and organizations. The project started in earnest in 2012, when water and sewer officials started looking into ways to reduce costs. Plymouth Area Renewable Energy Initiative (PAREI) and New Hampshire Electric Cooperative (NHEC) responded by giving assistance with getting a $317,000 grant from New Hampshire’s Renewable Energy Fund.

Greenest school list from Greenpeace, October 2014

PAREI gave us two good examples of green off-campus student housing in Plymouth. Don Stoppe runs Campus Edge Apartments. Micah McLane, operates Off Campus Rentals. Both are passionate about renewable energy and efficiency, and the results show in their rental units. Solar photovoltaics (PVs), solar thermal hot water and heat, heat pumps, and highly efficient insulation and air sealing have produced rental units that are cozy and inexpensively heated. Best of all, they are kind to the environment.

Pemi Baker Health Spa, June 2013

Pemi-Baker Community Health had two separate solar thermal energy systems. Design details were worked out with help from PAREI. One installation has two roof top evacuated-tube solar thermal collectors with a total of sixty tubes to pre-heat the water in a 119 gallon tank that feeds the primary electrically heated water tank. The other installation has eight solar thermal collectors, totaling 240 tubes, installed on the ground outside the facility to provide heat for the facility’s 18-by-36-foot therapy pool, saving 750 gallons of propane each year.

Dr. Jennifer Highland has an office that is close to net zero energy use. She says, "Going solar at my medical office was a no-brainer; it was just a question of working out the details. As a doctor, I find it impossible to separate the health of the environment from the health of the individual. New scientific studies every year are documenting the ways in which toxic substances released into the environment affect human health. This applies to chemical waste and food additives, but also to noise and light pollution and climate change."

Rand’s Hardware in Plymouth, December 2012

Steve Rand, at Rand’s Do it Best Hardware in Plymouth, could teach a course on fitting up old buildings for energy efficiency. He got a lot of experience retrofitting the building his hardware store is in, and which also has two other businesses and eight apartments. He got help with an energy audit, by Better Buildings New Hampshire and from PAREI, which eased the paperwork problems. Solar hot water, new insulation and skylights, new air sealing, new windows, and a new furnace reduced energy use impressively. Solar PVs are planned.

EcoHouse was designed at Plymouth State University (PSU) as a laboratory and showcase for sustainable living in residential settings. Both the technologies of physical structure and behavior adaptations for sustainability are considered. The EcoHouse Project started in 2008 and was funded with a grant from the University System of New Hampshire. The building already belonged to Residence life at PSU, and had four student apartments.

As class projects, students evaluated the house for energy efficiency and proposed projects. They had an integral role in designing EcoHouse. A number of community organizations also participated, including PAREI and D Acres of New Hampshire.

Efficiency measures included new insulation and use of integrated concrete forms for foundation repairs. Low-VOC paints, carpet, and drywall were used, as was natural linoleum flooring. Wood flooring was scrap from large projects. Other wood is local and sustainably harvested. Technology includes programmable thermostats, very low-flow shower heads, and dual-flush toilets. PAREI and NHEC supported student design and installation of a solar hot water system. D Acres of New Hampshire helped organize and run a workshop to establish compost bins at EcoHouse. Permaculture efforts were designed and installed by students studying relationships, perennials, growing food, and closed loop systems.

Learn about an ‘Uncommonly Green Inn & Spa’ in Plymouth. (See page 37)
The Solution To Utility Rate Hikes?

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Staff article

Solarize Upper Valley is a program of Vital Communities. It builds on other successful Solarize programs throughout the country, teaming up local communities with solar photovoltaic (PV) installers for 15 weeks of outreach. It is aimed at making solar energy less expensive through a tiered-pricing structure that brings the cost down for all participants as increased numbers of residents sign up. This makes solar power more accessible to residents.

The program’s long-term goals are to double the amount of residential solar energy in each of our partner communities and spark continuing growth in the region’s solar energy market. In this way, benefits may spread outside the participating communities and continue after the Solarize program is completed. The Solarize Upper Valley program demonstrates that the Solarize movement can be effective even in a rural setting and provides an open-source model to be shared with grassroots groups in rural communities everywhere.

Vital Communities coordinated two rounds of the program in fifteen towns in Vermont and New Hampshire between late 2013 and early 2015. The Round Two Report was released in March. It reports that every Solarize Round Two community met or exceeded its goal of doubling the pre-Solarize baseline of residential PV installations.

In the two rounds of Solarize Upper Valley, 301 homeowners contracted for solar installations, adding 1.7 megawatts (MW) of renewable energy to the region. Installing this much residential solar is an amazing accomplishment, and this is just the upper valley in VT and NH. In addition, dozens of other homeowners in partner communities were also inspired by Solarize to go solar with their own installers. Three of the five Round Two communities had enough participation to reach their lowest pricing tiers. Homeowners in all communities saved between 15¢ and 40¢ per watt from the base price at the beginning of the program.

Solarize Upper Valley will continue to do its work. Round Three will launch in June, 2015. For more information about Solarize Upper Valley call Sarah Simonds at (802) 291-9100 x 109 or visit their website at VitalCommunities.org/Solarize.
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MANY NEW MODELS AVAILABLE
Rutland’s growing Resilience

By George Harvey

It is hard to keep track of all the things relating to resilience going on in Rutland. Green Mountain Power (GMP) has decided the city will be the “Solar Capital of the Northeast” and seems determined to make that happen. As hard as that might sound, the work goes far beyond a mere installation of sufficient solar to power everybody. It includes efficiency, heat, transportation, and more.

The Stafford Hill Solar Farm is in the news, together with the microgrid it powers. These have won an award, which is reported on page 7 of this issue of Green Energy Times (GET).

The solar farm provides two megawatts (MW) of power, and its microgrid includes a four-MW battery, which can supply power to the city’s emergency shelter, together with nearby buildings. Among the buildings are a number of local residences. In the event of a widespread power outage, these buildings will continue being powered with electricity. The principal organizations behind the Stafford Hill Solar Farm are GMP and groSolar. The microgrid should be completed in July, and may be used as a model for others.

The number of solar farms in Rutland is impressive. NRG, NextSun, and the city have also been involved, together with customers, in over a dozen installations of varying size. They range in size from tiny to well over two MW. The total installed so far is well over 5,283 kilowatts (kW). The Stafford Hill Farm will bring the total to 7,790 kW, and there is an additional 2,253 expect to be started this spring, with help from groSolar and Green Lantern.

Making Rutland the Solar Capital includes a lot more than solar. GMP is working with NeighborWorks of Western Vermont and others on home improvements. In fact a hundred homes were targeted for complete makeovers (see the front-page article on Rutland in the June 15, 2014 issue of GET). The improvements include insulation, air sealing, and installation of ventilation systems, heat pumps, appliances, and solar panels. And in case you are wondering, yes – GMP is helping people install their own electric generating systems to reduce their electric bills.

It is our hope that Rutland will serve as a model for resilient energy systems that can become standard for communities of the future. The sorts of things that are happening in Rutland are available to other towns and cities, from the largest to the smallest. With proper planning and care, they can reduce costs right from the start, increase comfort, and lead to a more secure future for all of us.

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A dam of this size with a semi-Kaplan turbine could provide 58,469 kWh per year, with a gross value of $12,569 per year. And it’s for sale! Photo courtesy of Josiah Allen Real Estate.

By George Harvey

In February, we published “Affordable Power for NH,” the story of a small hydro site that had been generating capacity and was looking for power customers. The site is operated by Steels Pond Hydro under the guidance of Lori Barg, who gave us a wealth of information.

Some time back, she did an inventory of Vermont dams and other sites that could be developed to produce power for the grid. This was part of a thorough Vermont Dept of Public Service report, “The Undeveloped Hydroelectric Potential of Vermont.” It lists the potential capacity of about 300 of Vermont’s 1,200 sites, for a combined potential capacity of 90 megawatts (MW). Since the study was published, over 20 MW has been developed. (The report is available in three parts at bit.ly/VT-hydro-reports; look under “Vermont Reports” for Lori Barg’s name. We wish we had similar inventories for other states, but what is there is mostly obsolete, and the US Department of Energy (DOE) is still upgrading it. It is safe to assume that other areas comparable to Vermont would have similar undeveloped existing resources.)

An earlier study by the DOE’s Idaho National Labs identified 149 sites in Vermont, that could potentially produce 420 MW without a single new dam. The 420 MW potential means the sites identified by the Department of Energy could be an important resource. Assuming a capacity factor of 0.50 (meaning their average output is 50% of their nameplate capacity) Vermont’s undeveloped sites could potentially produce an average of 210 MW for each of a year’s 8766 hours, to produce 1,840 GWh/year. That is about a third of the electricity that Vermont uses. The result is spread throughout the state, and could potentially boost both the economy and the resilience of any community where one could be developed. A special search tool can be found at bit.ly/hydro-prospector.

The fact that the sites already exist is also important, because Vermont already has over 1,200 dams providing everything from flood control to recreation. We do not need more infrastructure in the rivers.

Just recently, we came across a hydro site in Vermont that is currently on the market, and it provides a really great example of a very small dam that could be developed. It is a historic mill in Shaftsbury, Vermont, about ten minutes north of the main areas of Bennington. It was used by a blacksmith at one time. It has an old turbine in place, once used to grind grain. This means some permitting is not needed because the new hydro turbine would be regarded as an upgrade, rather than a new installation.

Scull Hydroelectric Consulting, in North Adams, MA, recently estimated that a semi-Kaplan turbine would provide 58,469 kilowatt-hours per year, with a gross value of $12,569 per year. The site could qualify for group net metering and renewable energy credits; the precise value of the electricity produced depends not only on turbine design and weather, but the decisions on how the electricity is to be used or sold.

The building is beautifully built of stone. Dating to 1823, it is full of history, but the stone walls, history, and dam are not its only attractions. It is on a lot of 8.4 acres, much of which is open. The rooms on the first floor are simply stunning; they are very large and have beautiful massive beams across the ceiling. The thick stone walls could easily be given cushions to make attractive window seats.

The stone walls are beautiful, but stone conducts heat very easily. Though one person who lived there many years found the house comfortable as it is, it might be worth while to consider insulating the building, depending on how it would be used. Another consideration is that the mill is in a flood zone and a lender would require flood insurance. Interestingly, however, while Irene brought flooding on the land, it did not affect the house.

Despite features that might be daunting to the unprepared, it looks like the exact sort of thing some people would spend a long time searching for. Hydro-electricity is not the something a person can take up quite as easily as putting solar panels on the roof, so we would expect people who have done their homework on the subject and are still looking for a dam would be up to the challenge.

The mill property in this article is listed by Josiah Allen Real Estate/Manchester. Please see the ad for the property on this page. The property listing can be seen at bit.ly/hydro-site-for-sale.
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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.

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There will be a new residential loan program for solar PV to be announced in April or May, 2015.

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Through this loan program, customers may borrow up to 80% interest on 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.

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Available only to utility customers of Western Mass Electric, National Grid, Berkshire Gas, Nstar, Unitil and Cape Light Compact


NEA-TOCHT FARM HOSTS WIND TURBINE

The winds blowing across western Addison County, a part of Vermont with rich agricultural history, are now helping to generate more clean electricity thanks to Green Mountain Power’s third community-scale wind turbine at the Nea-Tocht farm in Ferrisburg. The Nea-Tocht farm is owned by the VanderWey family who milk 250 dairy cows. The family says the clean energy generated from their new wind turbine will save them $2,200 a year on electricity.

“Generating local power fits perfectly into our farm’s mission of growing local food,” said Ronald VanderWey, who owns Nea-Tocht farm, along with his wife, Linda and sons Howard and Sidney. “We are so pleased to partner with GMP to install this turbine that is not only a beautiful addition to our farm, but will help our bottom line. The name of our farm, Nea-Tocht is Dutch for Never thought and it’s fitting today because we never thought we’d be milking our cows with renewable energy, but we sure are glad to be.”

Green Mountain Power installed the Vermont-buil Northern Power 100kW turbine as part of its commitment to generating more local, small-scale renewable energy in Vermont. The first community-scale wind turbine was installed at the Northlands Job Corps in Vergennes in 2011. The second was installed at the Blue Spruce Farm in Bredorp in 2013, which is also the first farm in Vermont to put power from cow manure on the grid.

“It is so exciting to be installing a renewable energy project that is also benefitting a farm family,” said Mary Powell, Green Mountain Power President and CEO. “Providing small-scale clean energy throughout our service territory helps to improve reliability and is part of our mission to provide renewable, reliable and low-cost energy for our customers.”

The tower of the NPS100 wind turbine installed at Nea-Tocht farm is 121 feet tall. Each blade is 39 feet long. It can produce about 35,000 kWh per year – equal to the amount of electricity used by 25 homes. It has a 20-year life span. The manufacturer is Northern Power Systems, a Vermont company. The turbine was built in Barre, Aegis Wind, a general contractor based in Waitsfield, Vermont installed the turbine. Ground breaking was February 3 and the project took only a month to complete. The project is a part of the partnership with Green Mountain Power, Nea-Tocht Farm will receive a portion of the power produced through net-metering. Green Mountain Power will own, operate, and maintain the turbine.

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.

Through a $70 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.

masscec.com/programs/mass-solar-loan

DEPARTMENT OF ENERGY RESOURCES
Solar renewable-energy credits (SRECs) associated with system generation belong to the system owner and may be sold via the Department of Energy Resources (DOER) SREC program. 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 $1,000 max tax credit. No sales tax on residential solar hw or pv systems.

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

NEW MASSACHUSETTS SREC POLICY
Massachusetts’ new version of its Solar Renewable Energy Credits Program is informally being called SREC II. Under the earlier version, which expired last year, credits were given regardless of where the solar system was installed. SREC II prioritizes sites, however, by using an SREC factor based on the type of installation. The credits provided for energy produced by a system are calculated by multiplying the factor times a full credit value. Full credit is given for residential, parking canopy, emergency power, or community-based systems, or any other system of less than 25 kW. Larger systems get a factor of 0.9, if they are building-mounted or at least 67% of the power produced is used at the site. If a larger system meets neither of these criteria, but is built on a landfill or brownfield site, or if it is less than 650 kW, then it gets a factor of 0.8. Systems that qualify for none of the foregoing get a factor of 0.7.

More information can be found at: http://bit.ly/Mass_SREC_II
A Geothermal Heat Pump
WITH A POND LOOP
More Efficient than Air-source Heat Pumps

By George Harvey

Regular readers of Green Energy Times probably do not need any introduction to heat pumps. For anyone who does, a heat pump takes the heat out of a cold place, making it colder, and moves it into a warm place, making it warmer. A refrigerator has a heat pump, removing heat from inside it and moving it into the kitchen, so the refrigerator warms the kitchen while cooling the food.

Geothermal heat pumps take heat from the area just below the surface of the earth, typically five feet down or more, and move it into buildings or anything else that needs to be heated. They are more efficient than air-source heat pumps, partly because air does not transfer heat as easily as earth or water, and partly because the ground that far down is much warmer than the air on cold days. They are also more expensive because of the costs of burying a large amount of pipe, which could mean digging up a large area of a back yard or drilling a set of wells.

There is a special kind of heat pump that uses a "pond loop" as a heat source. In this case, the heat is obtained from a pond, lake, or river that acts as a thermal mass. For anyone who has easy access to a suitable body of water, a pond loop heating system should be less expensive to install and to run than a typical geothermal system.

For anyone who has easy access to a suitable body of water, a pond loop heating system should be less expensive to install and to run than a typical geothermal system.

One thought that would probably cross the minds of many people is that their land might be suitable to build a pond for the purpose of a pond loop geothermal system. This is a real possibility in many places. A pond is a wonderful thing to have, and there are many reasons to install one. Having a copious supply of water at hand can lower fire insurance costs in some places. A pond can be stocked with fish, and can be used to grow edible water plants. With the strong suggestion that professionals be included in the planning process, we highly recommend the idea where it is practical.
Lower operating cost for hot water, lower carbon footprint, even raise the value of your home. Showering never felt so good!

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BRINGING G.E.T. TO NY
The Story Behind ‘The Times’

By Wyldon Fishman and Joanne Coons

“The mission of the New York Solar Energy Society (NYSES) is to educate children and families about energy conservation and renewable energy,” stated Wyldon Fishman, who is the founder of NYSES. “In October of 2014, I peeked at the front page of G.E.T. and thought, ‘This is incredibly well written.’ A few days later a friend saw her of the Terry newspaper she’d been subscribing to and wanted to contact the folks at G.E.T. and see if she could get copies, maybe even write some articles. Joanne said her husband liked it so much he would try to hide it and read it first. By the beginning of February we were sharing issues at the home show in Albany. By March we’d gotten a positive response from Nancy Rae and we were on our way to bringing G.E.T into NY. Time to roll up our sleeves, sell ads and find distributors. The pent-up demand is huge for a well-written resource publication that’s free.” Coons concludes with, “Sound information is the key to positive change and we feel that GET provides this. We hope New York State will lead, not follow in making good energy choices.”

STEPS TO ENERGY INDEPENDENCE IN NEW YORK STATE

By Joanne Coons

Historically we controlled the candle, the fireplace, the horse. For a century we have incorporated cleaner on-demand energy to providers and now we are dependent on them. Convenient! Flip the switch! Today with new technology and the Sun providing us with more than enough energy even at our latitude to cover our energy needs, maybe it is time to rethink how electricity is provided to us and to become independent in terms of electricity use. Here are some steps to help you streamline your conversion to sun-powered electricity known as photovoltaics or “PV.”

1. Reduce your electrical usage, or “shed load.” Load is the amount of electricity used to operate your home. You’ve probably already changed a few light bulbs or bought a new Energy Smart refrigerator. You’ve made a positive step to your savings and for your carbon footprint. The best way to save energy is not to use it. Each watt saved is a “negawatt.” Where to start? New York State Energy Research and Development Authority (NYSERDA) has a sensible, comprehensive list of steps you can take. Some of these steps require behavior changes and some of them require smart consumer choices when purchasing electrical devices. Here’s the link: bit.ly/NY-energy-saving-tips

2. After taking action to reduce your load (“load shed”) by yourself, it’s time to get a home energy audit or assessment. This step will be more technical and will dig deeper into how you can save energy. For most this will be a free assessment followed by financial incentives! When completing recommended improvements, a discount covering 50% of the cost of eligible energy efficiency improvements up to $5,000 per project for single-family homes is available. Two-, three- and four-unit homes with income-eligible residents may qualify for a discount of up to $10,000. Every unit with a meter in a condominium gets $5,000. bit.ly/NYSERDA-how-it-works

3. Now it is time to look for a solar installer. You can approach the solar project a couple of ways. You can try to cover your whole remaining electrical load with the necessary amount of PV, or you can budget a certain amount of money and purchase the maximum amount of PV to offset your load. Please take into consideration here why it is so important to reduce your load. Why would you purchase PV to power extra load? It is really cont’d on p. 24

Solarizing NY’s Capital Region

By Stephen Andersen

Citizens are working with fellow citizens to bring solar energy into their communities. Today, volunteer “Solarize” campaigns are growing in popularity throughout New York, giving both residents and businesses new options for installing solar power while saving money.

The Solarize framework was developed by the US Department of Energy (DOE), and debuted in 2009 in Portland, OR. Two years ago there were only two Solarize campaigns in New York State. Now there are 26, and many more across the country. Why is Solarize becoming more popular? Because it addresses three obstacles to solar:

• Cost - Solarize campaigns lower the cost of solar for homeowners 10 to 20 percent by organizing bulk purchasing among dozens of community members to install solar from a selected installer.

• Technical complexity - Both solar panels and the businesses that install them can vary in quality. By securing experts to review projects, Solarize campaigns provide an extra level of quality assurance.

• Extended decision times - when individuals solicit proposals from several solar installers, it can be overwhelming. An individual can take months or even years to choose a solar installer. Solarize groups address this by securing an optimal installer and equipment, then making that solution and discounted pricing available for only three to four months.

Solarize campaigns also encourage neighbors to get to know one another. As individual homeowners install solar power, neighbors are inspired by their example. Neighborhoods are strengthened.
NET ZERO ... in Clifton Park, NY

AN INTERVIEW WITH THE OWNER OF A NET ZERO HOUSE

By Green Energy Times Staff

Can you briefly describe what a Net Zero energy home is? It makes more energy than we use. When or how did you first hear about Net Zero energy homes?

Through reading and attending conferences like NESEA Green Building.

What were your motivations for transforming a 1830’s historic farmhouse into a Net Zero energy home?

We had tinkered with renewable energy at our last home which was an 1852 Greek Revival home. Our children were grown up and it seemed like a good time to downsize and this farmhouse was sitting vacant for 10 years. We felt it was a shame to lose it to development since it had character and charm.

Do you think it was a worthwhile investment? Absolutely.

Why? Great location, (passive solar, sited facing south) as stated already, charm and character, comfortable living.

Compared to previous homes you’ve owned, how does this one compare with regard to energy efficiency?

Since we had totally gutted this home, we had control over air sealing and insulation which allowed us low energy needs to operate. By building the home right we could reduce our heating and cooling.

Could you describe the different energy-efficiency technologies employed in your home?

- Heating and cooling is taken care of by ground source heat pump, air exchange by Life Breath, original windows on south side with magnetic storms and operable windows.
- Low cost of living and the comfortable environment inside the home (said to watch the meter spin backwards).
- How would you describe its performance in the summer vs. the winter? Equally comfortable, there isn’t a swing in temperature or humidity.
- Would you recommend building a Net Zero energy home to other home owners? First steps are load reduction and insulation; it can be a process, not an event.
- Doing something is better than nothing.
- I am amazed at how many people don’t take advantage of NYSERDA energy audit, this is a great first step.
- What was the building-renovation process like?
- Fun because it is a real learning experience. Solving problems such as design to provide form and function is something my husband and I enjoy. We attend lectures, read, go to conventions and network with many people.
- What kinds of questions did you ask your builder going into the process?
- My husband had just retired and needed a “project” so he was the GC. We talked about solutions to problems daily through the planning stages and construction. Our architect and engineer were very helpful.
- Measure twice, cut once. Planning is key.
- What kind of financial incentives did you use/receive when installing the system?
- NYSERDA incentives and Federal tax credit.
- Could you describe the process of applying for/receiving the incentives?
- Our solar installer, Kevin Bailey, pretty much took care of the incentives since he received the money and our tax preparer is knowledgeable about renewable energy tax credits due to another job she has had.
- Did you or will you receive any tax credits because you built a Net Zero energy home?
- Yes but anyone installing renewable energy would. It doesn’t have to be Net Zero.
- Was NYSERDA helpful in getting the home built? If so, how?
- Yes, made installation of the renewables more affordable.
- Is this a New York ENERGY STAR® Certified Home?
- Yes.
- If you could say one thing to people who have never heard of a Net Zero energy home, what would it be?

We know how to build an energy efficient, comfortable home that saves energy, reduces fossil fuel consumption, and ultimately cost much less to operate. It would be in our best interest to adopt these practices for a healthier future. Anything else you’d like to add?

Since we have an excess of electrons (energy) we “dump” them into our cars, an all-electric LEAF and plug-in Prius. This also helps reduce our fossil fuel consumption. We use an electric snow blower, grill, lawn mower, weed whacker. We use electric whenever we can so we can use our own home-grown electrons.
Remarks of a Local Windows Pro
Loewen Window Center of VT & NH

By N. R. Mallery

New window technologies have improved both efficiency and comfort. We also have an ever-expanding range of options. Selecting the right window for a home requires tradeoffs among efficiency and other issues to achieve the most desirable results, so understanding of some basic energy concepts is essential.

We have asked the owner of a local window company carrying many different lines of windows to help us understand some of these things. Steve Cary, who runs Loewen Window Center of Vermont and New Hampshire, in downtown White River Junction, has been kind enough to help us out.

At the store website we are told, “We specialize in high performance windows and doors from North America & Europe. Our products emphasize quality, durability and exceptional energy performance at a range of pricing levels. Our philosophy is simple; provide solution oriented, extraordinary and friendly service before, during and after the sale.”

Steve knows the need to stand behind the window lines he carries, and this is an important factor to take into consideration when deciding where to purchase new windows. Many companies claim to have the “world’s best energy-efficient windows” and not all claims are true. Windows’ features or specifications are not all of what is important. Durability and the follow-up of manufacturers and dealers count for a lot. (One day I will tell you about how all my own windows, from another company, failed. My advice is, keep it local; keep it professional.)

Steve had these observations and suggestions on different subjects.

Insulating value and condensation resistance. The entire window structure has to be taken into account to measure thermal performance to get a U value, and the lower the number is, the better. The sealed units of the double or triple glazing are filled with argon or krypton gas to reduce heat transfer and eliminate condensation on the interior surface of the glazing. Good frames for thermal performance have low conductivity from thermal bridges. Solid aluminum does not perform as well in this regard as wood, fiberglass, or vinyl (PVC). [Aluminum cladding is a separate issue. –ed.]

Solar Control and UV Protection Thin, metallic, low-E coatings are important for solar control and ultraviolet protection. Typically, a greater number of low-E coatings reduces heat gain and will result in a darker tint. A further step for UV control can be taken by using laminated glass like that used for cars.

Daylight and view The best performance means greater numbers of low E coatings, but that may darken the glass too much. A compromise to get more light in is to use triple glazing.

Ventilation and air-sealing Window and doors can swing either in or outward, or they can slide. Large openings are in fashion and can provide energy efficiency. Manufacturers test for design performance (DP) and performance grade (PG). The PG test takes into account wind, water and structural performance. Usually a casement, awning, or tilt-and-turn type window will perform better than one that is double hung.

Sound Control Double- or triple-insulated glass will definitely reduce sound. A special sound transmission glazing is available for greater reduction.

Privacy, Safety, and Security For privacy there are dozens of choices such as frosted and sandblasted glass. Safety glass can be tempered and laminated to resist flying debris from storms or impacts.

Maintenance, Durability, & Lifetime Wood windows should be made from decay-resistant species like Douglas fir, Pine should be treated with preservative and sealed well. Various exterior treatments include aluminum, vinyl, UPVC (plasticized PVC, which is a more durable and less harmful type of plastic), fiberglass, or a new solid composite material made of acrylic polymers called Compositewood.

Installation Strictly follow the manufacturer’s instructions. Pay special attention to doors, as they are the industry’s greatest callback cause, and many problems relate to installation.

Economics PVC is the lowest cost window-frame material, then composite, fiberglass, and aluminum-clad.

The website for Loewen Windows of Vermont and New Hampshire is www.loewenvtnh.com. Steve Cary has been in the construction business since 1977 and has been specializing in windows since 2000.
In the 1930s, getting electricity to a farm was expensive. It cost $2000 to $3000 per mile to bring power from the nearest utility pole to a farm, and very few people could afford it. Unsurprisingly, most of the farmers in this country did not have electric service. The Rural Electrification Agency (REA) was set up to change all this. One thing he mentioned is that there were thousands of farms in the state that had been abandoned, and electricity made it possible for people to move back to them and reestablish their lives in them.

In time, the NHEC grew to have 80,000 members in 116 towns and cities. As it grew, it responded to the changing demands of the times. One important turning point was in 1973, when the country suddenly found it was out of gas and short of home heating oil. The NHEC responded with a number of measures that sound surprisingly forward-looking.

The NHEC introduced weatherization and other efficiencies. It provided energy audits, complete with blower door tests. If the member acted on the results, the cost of the audit could be waived.

In the 1980s, the NHEC started to get interested in renewable power. It bought power from the Tug Mountain Wind Farm in 1984, with ten turbines of 60 kilowatts each. This was the fifth wind farm installed in New England and somewhat experimental. The output of the turbines was disappointing, mainly because winds at the site were less powerful than expected, so the turbines were taken down and sold in 1988. It was, however, a start.

The 1990s saw energy audits taken to a new level. They went beyond measuring heat loss and the quality of air sealing to examine the performance of individual appliances. Today, NHEC offers a program that allows members to turn in an old refrigerator or freezer and get $30 for it.

Help was not only with energy audits, but with finding and applying for incentives. Just as it had done with energy audits, the scope of assistance to members was not limited to electricity, but to other forms of energy and efficiency. For example, there has long been help for conversions to solar thermal water heating. In fact, there is help to be had for members who want to do just about any efficiency or renewable energy improvement that can operate on a practical level. A special fund was set up just for this purpose in 2007, and it has been run since.

The programs that the NHEC has today are numerous. Whether a heat pump is needed or a member wants to install a solar photovoltaic system, there is likely to be something just for the purpose. This is true for both residential and commercial accounts. Truly, there are too many to list here, with nine residential programs and eight business programs. We highly recommend that Co-op members who can use them find out by going to the NHEC website and following the “Co-op Energy Solutions” link. The website is www.NHEC.com.
89 WAYS TO SAVE
From NYES (New York Solar Energy Society)

1. Use your own shopping bags.
2. Shop near home; support a business.
3. Join a “CSA” (community sustainable agriculture) for fresh local food.
5. Organic foods save the soil and are better for you.
6. Eat what’s in season.
7. Use a refillable water bottle.
8. Buy in bulk to reduce excess packaging; reuse jars and sacks.
9. Eat less meat. Livestock accounts for 20% of CO2 gas.
10. Use cloth for napkins and cleanup.
11. Wash clothes in cold water.
12. Only pre-wash dishes if necessary; open the dishwasher door to dry.
13. Turn off the water while shaving and cleaning teeth; take short showers.
14. Sunshine to heat water is free.
15. Use a clothesline or a drying rack.
16. Organize baking so dishes are together or one right after the other.
17. Consider very-low-energy appliances.
18. Use organic, chemical-free cosmetics and shampoos.
19. Concentrated soaps use less packaging.
20. Keep the freezer full but the refrigerator with air space.
21. Use glass storage containers for refrigerated food.
22. Clean your refrigerator coils.
23. Take public transportation.
24. Unload and lighten your car for better mileage.
25. Keep your car tuned, and tires aligned.
26. Use car-share, carpool, bike or walk.
27. Drive a hybrid, diesel, or EV.
28. Turn lights off when not in use.
29. Put lights on dimmers or motion.
30. Switch off devices on standby.
31. Fix leaky faucets and toilets.
32. Fix broken faucets.
33. Caulk drafty leaks.
34. Install ceiling fans; use only as needed.
35. Remember, LED lamps save money.
36. Get rid of incandescent bulbs.
37. Use power strips for easy on-off.
38. Pack a small carry sack.
39. Tell your town you want to save energy.
40. Use outdoor lights to point light down.
41. Volunteer at your local park.
42. Avoid food grown with GMOs.
43. Shrink the lawn; feed it with compost.
44. Carry, wash, and reuse plastic utensils.
45. Ask to be deleted from mailing lists.
46. Print on two sides of the paper.
47. Bring unused items to a thrift shop.
48. Look for swap meets.
49. Buy things that will last.
50. Try products made from bamboo, sheets, towels, cutting boards, flooring.
51. Use tea balls.
52. Keep your coffee hot in a thermos.
53. Caulk drafty leaks.
54. Install tea balls.
55. Use awnings to cool and protect your furniture from UV light.
56. Plant deciduous trees for summer shade and winter solar gain.
57. Fix leaky faucets and toilets.
58. Buy things that are reusable.
59. Use solar-powered battery chargers.
60. Carry a handkerchief or bandana.
61. Wash diapers in hot water with a non-powered tool.
62. Use solar-powered battery chargers.
63. Carry a handkerchief or bandana.
64. Wash diapers in hot water with a non-powered tool.
65. Use solar-powered battery chargers.
66. Carefully recycle old electronics.
67. Make old homes more efficient.
68. Use awnings to cool and protect your furniture from UV light.
69. Plant deciduous trees for summer shade and winter solar gain.
70. Fix leaky faucets and toilets.
71. Buy things that are reusable.
72. Use solar-powered battery chargers.
73. Carry a handkerchief or bandana.
74. Wash diapers in hot water with a non-powered tool.
75. Coffee shops will refill your mug.
76. Wash clothes in cold water.
77. Keep your investments green.
78. Give solar panels as gifts.
79. Evaluate new appliances and vehicles for efficiency before you buy.
80. Driving safely saves on gas.
81. Change snow tires without delay.
82. Compare fuels to heat efficiently.
83. Shop for cold climate heat pumps and water heaters, pellet boilers and furnaces, and much more.
84. Efficiency Vermont received DOE funding to buy down the interest rates on their Property Assessed Clean Energy (PACE) financing and The Department of Public Service has recently created a new Heat Saver Loan program. To take advantage of the PACE financing, homeowners must live in one of the 30 towns in the state that have adopted PACE, but the Heat Saver program is open to everyone in the state. Financing efficiency measures at these low rates can result in energy savings larger than financing payments, so you save money and save energy at the same time.
85. Insulate pipes well.
86. If you have a warm-air heating system, consider sealing and insulating it.
87. There are good low-tech, do-it-yourself ways to air-sealing doors and windows.
88. There are many cooling options available in addition to air conditioning.
89. Microwaves are very energy-efficient.

NEW LOW-INTEREST FINANCING FOR ENERGY IMPROVEMENTS IN VERMONT

Efficiency Vermont has recently announced two programs that provide low-interest (0% to 1.99%) financing for making home energy improvements, including energy audits and weatherization, cold climate heat pumps and water heaters, pellet boilers and furnaces, and much more.

NH PROGRAMS THAT MAY BE ABLE TO ASSIST YOU WITH IMPROVING YOUR HOME

The Weatherization Assistance Program is available for low-income households in all 50 states and is funded by the US Department of Energy. Comprehensive services are provided by a network of Community Action Agencies that serve all areas of New Hampshire. Details about this program can be found at bit.ly/NH-program-details. If you work with one of the local agencies, check “NH Weatherization Assistance Program AID Certification” to see if a full member of the Residential Energy Performance Association works there and request that person for the audit.

The New Hampshire Electric Cooperative has a number of rebates and incentives to help NHEC customers improve the efficiency of their homes or incentives to help meet Energy Star® Program requirements. Information can be found at bit.ly/NHEC-solutions. NHEC also offers zero interest loans that can be paid back through the monthly electric bill. See bit.ly/NHEC-zero-interest.

NH Saves is a collaborative effort utilities in New Hampshire, NH Saves provides important information on improving the efficiency of your home and provides rebates and incentives to reduce your costs. www.nhsaves.com.

Solarizing NY’s Capital Region
Cont’d from p. 20

Community Solar NY is part of Governor Mario Cuomo’s NY-Sun initiative. This $1 billion program will advance the scale-up of solar and move the state closer to having a sustainable, self-sufficient solar industry. It is also an important strategy under the governor’s Reforming the Energy Vision plan, which seeks to create an energy grid that is clean, reliable, affordable, and one that can lead New York to path of reducing greenhouse gas emissions 80 percent by 2050.

Here is a list of Solarize campaigns in New York’s Capital Region. Please follow-up with the campaign in your area to request a proposal for your home or small business, or to volunteer to make the amainp in your community a success!

Albany County, Active project. Installations planned in 2015. Contact Dave Hochfelder: 609-948-4668 or solarize@hispano.com.

Clifton Park (Town), Project being formed. New team members welcome. Contact Joanne Coons: 518-522-3173 or coonjоon@gmail.com.

ENERGY INDEPENDENCE IN NYS
Cont’d from p. 20

It is easy to purchase PV because it is up to the installer to size the system, design it, fill out the paperwork to tie the system to the grid, apply for local building permits, install the system and “commission” it.

4. Buy or lease? When you lease, you are typically going to save between 10 and 50% of what you would pay the electric utility. When you purchase your annual rate of return, or payback, can range from 10-30% depending on your location, state incentives, and property characteristics, and after the payback period, you will get free electricity for decades.

Understanding the installation process can be mind-boggling and we encourged you to find out about it but don’t let that get in the way of participating in adding PV to your power home. In fact once you do purchase your own energy, energy becomes more precious and you may find yourself more conscious of the weather, your energy use and choices. You will also find that living a “PV” lifestyle doesn’t mean you suffer, you just make smarter choices.

Joanne Coons is an adjunct professor at Hudson Valley Community College, TEC-SMART faculty teaching Photovoltaic Theory and Design. She has a BS from SUNY Cortland and an MS from SUNY Albany in secondary science education.
**NEWS, CLUES, & REVIEWS**

**BACKYARD ROOTS!**

By Lori Eanes, 190 pages, Skipstone Books, $21.95

**Book Review by N. R. Mallery**

Backyard Roots is a collection of stories about people who farm on what small pieces of land they have available in crowded, mostly urban, areas. They all live in West Coast areas of the United States or Canada, but the lessons they have are for all of us who garden.

The thirty-five people or groups whose stories are told all have start-ups, of one type or another. Some keep bees, and some keep chickens or even ducks. There are fish farmers raising tilapia in urban aquaponics systems. There are barn goats. Somehow the idea of operating a dairy farm in a city puts me into a contemplative mood.

There are discussions of different farming methods. Composting is discussed, both for methods of dealing with waste and to provide fertilizer. Water is another issue of importance, and collecting rain water in the urban environment is covered.

The organization of farms is as varied as the products. Many of these people work alone or with their families. They have community organizations, and some of these work with greenhouses or recovered lots that had previously only grown weeds and collected trash. One has a crop garden and a community kitchen.

In addition to the stories, Backyard Roots has a large number of tips for those who might want to have urban farms. Some of these are simple suggestions or observations on how best to do things, but others go into details about some very specific issues. For example, suppose a person wants to raise poultry in an urban setting, but zoning or city ordinances forbid it. The book addresses the questions of what can be done and how to do them.

Backyard Roots is a book I could not put down. Not only does it have value to anyone who might want to run a micro-homestead, it is just plain fun to read. Clearly, I recommend it highly.

Visit the Backyard Roots blog: http://www.backyardrootsbook.com/, for lots more stories and a link where you can buy the other book. Your head will spin with ideas and know-how!

**The Woodchuck Returns to Gardening**

By Ron Krupp, 247 pages, Whetstone Books, $18

**Book Review by George Harvey**

The Woodchuck Returns to Gardening is one of those books that may be exactly what you want it to be. It could be an introductory book on vegetable and fruit gardening, or a highly readable reference, for those who need it, or a highly readable reference, for those who are more experienced. Or perhaps, it is just something to enjoy.

The book starts with a journal of the years 2012 and 2013, comparing the two years on a month-by-month basis. This is useful, because it contains a basis for planning the month-to-month goals of preparing the ground, planting, tending, harvesting, and preparing food. Unlike most chronologies of garden activities, however, by comparing months from two very different years, it illustrates the potentials, what to expect and what to be ready for.

The journal is followed by three sections, each on vegetables, berries, and fruit. Each section begins with a general description of the tools, methods, and knowledge needed for the plant covers. Preventing plant disease is one important aspect of this, but so are other principles. The amount of light exposure, the type of soil, pH, temperature ranges for growing, and other information are all covered generally. This is followed by a list of types of plants, each covered with a number of its own specific details, such as information on growing the different varieties, what they need, and what they are like.

Each section has commentary about things ranging from the politics of sugar to the history of fruit. The author’s background includes not only organic gardening, but also biodynamics, which was developed by Rudolph Steiner, founder of the Waldorf educational system.

The book has many references to religion and spiritual practices as items of interest. There is plenty of information about heirloom seeds, both old varieties and new, and a few species most of us have not grown, but might now, because of climate change. People in New York, Vermont, and New Hampshire are starting to cultivate pawpaws and kiwis, for example.

The book does not neglect the harvest once it has been gathered in. Brief descriptions of how the food might be prepared are given. The material on pickling does not go into detail, for example, but it does point the gardener in what might be a valuable new direction.

Ron Krupp is a resident of the South Burlington area, and the gardening he describes is the gardening he does there, with conditions in that part of Vermont. That said nearly everything he says can apply to any of the Northeast. Given the rule of gardening that he often repeats, “It Depends,” what he says could apply to just about anywhere.

There are many illustrations, both photographs and artwork providing visual interest for The Woodchuck Returns to Gardening. There are also poems, observations, stories, and wit in abundance.

I highly recommend this book.

**PREFABULOUS + ALMOST OFF THE GRID**

YOUR PATH TO BUILDING AN ENERGY-INDEPENDENT HOME

SHERI KOONES FOREWORD BY ROBERT REDFORD

**Review by N. R. Mallery**

Some time back, Sheri Koones watched as a pre-fabricated house was being built. She was impressed by the speed and efficiency of construction. She was also impressed by the beauty of the finished product, but when she talked with friends about this, she found them disbelieving. It turned out they were thinking of very different construction from what she had seen.

She started writing about prefabricated housing that most people did not know anything about. These are beautiful, spacious, comfortable. They could also be expensive, even though they were built as modulars in construction plants, instead of out in the field. Prefabulous + Almost Off the Grid is one of several books she has written on these homes.

The fact that they were built of modules also does not preclude purchasers having homes that are uniquely their own, as many readers of Green Energy Times might know. The homes built in the controlled environment of Bensonwood’s plant in Walpole, New Hampshire were covered in GET’s June 15, 2014 issue. Most of them are entirely custom designed by architects for the customers who order them.

Sheri Koones covers Bensonwood’s more moderately priced Unity Homes series in this book as one of over thirty designs she describes in some detail. Here, however, her interest goes beyond what is efficient and beautiful to what is highly efficient without sacrifice of appearance. This makes it really an inspiration. The houses she covers are not necessarily passive, but they are all getting close to that goal. They are also approaching it in a way that is highly durable and practical in the long term because of the construction advantages of modular construction.

The combination of efficiency and beauty was not lost on actor Robert Redford, who wrote the book’s introduction. We live in a time when we need to find new and better solutions to the problems we have with pollution and resources protection. He clearly points out the fact that residential buildings account for thirty-eight percent of all of our energy use. If we can reduce that to the smallest amount possible, then we will have gone a long way toward preserving our environment.

Sheri Koones tells us about one way we can save the environment and at the same time live more comfortably, in more beautiful surroundings, often at lower cost. It might possibly not be the only way of achieving those goals, but it is most certainly one of them.

This is a book that anyone who is considering building a home should read. Doing so will not only benefit the reader, it will very likely benefit all of us.

As pictured above, Koone’s book includes designs and descriptions of Unity Homes, who you have seen many times in the pages of Green Energy Times (Bensonwood). They build prefabulous homes here in the northeast! Be sure to pick up a copy of this book and her others, written to help you find this path to an energy-independent home. Photo courtesy of Bensonwood.

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WWW.GREENENERGYTIMES.ORG 802.439.6675 April 15, 2015 25
Devastating Cuts to R/E in NH
cont’d from p.1

If you wish to carefully compare the two budgets, see the Governor’s budget at bit.ly/gov-2015 and the House budget bit.ly/house-2015. The next step in NH’s budget process is to send the House budget to the Senate, and then on to committee of conference. The committee is tasked with getting the Governor’s budget aligned with the budgets of the Senate and House of Representatives, which are currently very out of sync. A final bill must be passed by June 25 by both bodies, in order to be ratified by the Governor in time for the beginning of the fiscal year, July 1st.

What can you do?
See https://legiscan.com/NH/bill/HB2/2015 to find out how your representatives voted. Then go to http://www.gen-court.state.nh.us/house/members/wml.aspx, look up your legislators’ info, and let them know what you think of this attack on renewable energy funding! It will be most effective to send your comments to your State Senators and to the Governor. Let your legislators know that:
• Solar currently supports over 600 jobs in New Hampshire from more than 68 companies (37th in the USA).
• In 2014, over $11 million was invested in solar installations in New Hampshire, a number poised to double this coming year.
• Solar energy prices continue to decline -- 8% decline just in this last year, and 50% from 2010. Solar energy rebates are still required to drive solar’s rapid growth, as it allows homeowners and businesses to leverage federal incentive programs and lock in electric rates below utility.
• The first-ever “Value of Solar” study in Maine found that solar’s benefit to Maine ratepayers was roughly double the compensation offered under net metering. This means, far from being a burden, NH’s net-metering laws are in the public interest, and every solar installation that is put in offers a huge value to ALL ratepayers, not just the entity going solar.
• Nationwide, 31,000 solar jobs were created in 2014; solar jobs grew by 20% while all other industry sectors added jobs at 1.1% rate.
• New Hampshire’s 8MW of installed solar offset an estimated 3,524 tons of carbon pollution in this last year and saved solar customers an estimated $1.2 million in electricity costs.

Frederick Greenhalgh is the digital marketing manager for ReVision Energy in Exeter, NH. (207) 221-6342 x 205.

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Energy Efficiency From the Ground Up
Building with ICF’s and SIPs

By Alison Moynihan

There is a ton of advice out there for how to build energy-efficient buildings, and more important, there are a thousand different ways to successfully construct an energy-efficient building. That said, I propose that Insulated Concrete Form (ICF) foundations and Structural Insulated Panels (i.e. stress-skin panels or SIPs), should rate high on your list of good options.

While the ground doesn’t get as cold in the winter or as hot in the summer, it is still outside our comfort range. Therefore we need to insulate between our conditioned space and the ground. The easiest way to get a fully insulated foundation is a true floating slab with continuous insulation underneath or with a crawlspace and an insulated 1st floor deck. However, in New England we love the storage and the place to put all our mechanicals provided by a basement.

That means we need to figure out how to insulate our basement walls so we can have a completely insulated building shell. The debate rages: do you insulate inside, outside, both, or in the middle of your concrete wall?

Middle: Thermally ideal, excellent durability, but requires careful structural design and some designs have significant thermal bridging.

Inside only: Excellent durability, easy renovation, but can cause dew-point on inside of concrete

Exterior only: Concrete can act as thermal mass, but can be difficult to connect to slab insulation and has durability issues.

Insulated Concrete Forms: Good thermal performance, can eliminate the need to use conventional forms, but has durability issues for exterior half of insulation.

Once you have weighed your basement wall insulation options and committed to continuous slab insulation, the final piece is the footing. Many high performance designers just wrap the footing with insulation or put a foam gap between the wall and the slab. The foam gap means that your basement wall is no longer fully supported by the slab which means the footing needs to be much deeper to resist the weight of the soil pushing inwards. Foam under the footing risks your wall settling as the weight of the house compresses the foam. Of the two, the foam gap is better because you can compensate by making the footing deeper, whereas foam under a footing makes engineers wince at all the potential problems.

Once you have dealt with protecting your building from the ground you must deal with the brutal cold of a New England winter. There are two ways for your above ground walls to affect the energy use of the building: one is managing heat flow through conduction, and the second is managing heat flow through air infiltration. SIPs are inherently better at limiting both conduction and air infiltration losses.

To address conduction of heat, it is all about the whole surface R-value. The most common insulation material for SIPs is EPS (expanded polystyrene), which has a reasonably good R-value of 3.85 per inch. However, the real savings is in the structure, the structural elements of the SIPs are the skins, and there are no studs except where necessary for point loads. In a standard 2 x 6 foot wall between 18% and 33% of the R-value is lost to the studs; in a standard SIP wall only 5% to 20% is lost. Regardless of your construction type, the more windows there are, the higher the framing percentage will be. SIPs have an inherent advantage over regular stud construction, even when comparing to double stud walls. SIPs have a higher whole surface R-value for the same thickness. Put another way: a 6.5” EPS panel performs at the same level as an 8” cellulose filled double stud wall.

The second and often the more important energy saving factor is air tightness. Any building that is trying to achieve energy performance should be using an HRV or ERV with a balanced ventilation system to recover as much of the heat as possible that is lost through required ventilation. All SIP buildings are tight enough that they require mechanical ventilation. While conventional construction with planning and a very careful crew can be air tight, SIPs can reach the highest levels of air tightness with Foard Panel’s default joinery.

Why choose SIPs?
Because you get more performance with less materials, less time on site, less waste, and less floor area given to wall thickness. When asked if SIPs are cheaper, the question is what are you comparing it to? A 6.5” SIP wall is almost certainly cheaper than an 8” double stud wall detailed for air tightness, but it is not usually cheaper than a typical code minimum 2 x 6’ wall.

The final piece of any high performance envelope is the windows. They do everything the wall does, plus they have to be transparent and operable. They have the unique opportunity to help heat the building, not just conserve heat, but they can also overheat the building in the summer if you don’t plan for exterior shading. In New England, windows should be minimized everywhere except the south side of the house and you need to be thinking about very high performance windows. The air sealing of your windows is just as critical as the air tightness of your walls. Any energy modeler will tell you that the quality, quantity, and layout of your windows has a whole lot more influence on the energy performance than thermal bridging or that even that extra inch of insulation in the walls, roof, or slab.
A Few More Thoughts About...

Windows in Double Wall Construction

By Michael Goetinck

A reader sent me an email about a window condensation problem he has in his home. I’ve taken the liberty of sharing our correspondence. The text from his email is in italics. My response follows:

Your article on Deep Energy Retrofit Windows in the Feb. 15 issue of Green Energy Times was of interest to me as it was the first time I had seen anything written about where to best place a window in a double-style wall. What I found missing in the discussion was the humidity/condensation aspect of placement. I have R-40 walls, 16” thick, and not being very savvy then, when my house was built, I agreed to the windows being mounted flush with the exterior of the walls. This was not a good choice as in my tight house (45-50% humidity) the double and triple pane windows (Inline - fiberglass frames) will get wet and even have frost on them near the bottom (below 20 degrees outside). This is mostly due to their deep placement and the resultant difficulty of heating them from the room’s heat because the convection flow is constrained. As many windows have a high temperature source of heat beneath them in the form of baseboard heating, this is less of a problem than my case, low temperature floor heating. How to solve my problem? I’m thinking a low flow battery powered air fan in each window or maybe several ceiling fans - not an elegant solution but cheaper than having the windows reset to a better position within the wall.

As you imply, one of the additional benefits of placing the windows in the middle portion of the wall assembly is that it is closer to the interior conditioned air. I also think that having flared window openings on the interior is important because the window units are not as removed from the interior conditioned air as it moves around the house. Essentially a larger opening is created which allows more warm air to come into contact with the interior side of the window unit. The air undulates into the window openings instead of having to turn corners.

That being said, I have two small windows in my basement that are in rectangular openings as opposed to flared ones and they don’t experience any condensation or frost. I suspect that both the location of the window units in the wall assembly and interior relative humidity levels are contributing to the condensation problem at your place. Is there any way for you to reduce the interior relative humidity levels in the 40-50% range are typically recommended for comfort and building durability, but it may need to be lower to rectify the concern raised by the reader. For what it’s worth, my house typically runs at 20-30% and we’re very comfortable. Enjoy, Michael

Windows and doors are the weak link in thermal performance (assuming everything else is done correctly). Maybe someday this won’t be the case, but for now, no matter what you do they will not perform as well as a high performance wall assembly. Placement, air circulation, and interior moisture management have to be part of the plan. Heat recovery ventilators (HRVs) can help with indoor air quality and moisture management. Relative humidity levels in the 40-50% range are typically recommended for comfort and building durability, but it may need to be lower to rectify the concern raised by the reader. For what it’s worth, my house typically runs at 20-30% and we’re very comfortable. Enjoy, Michael

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.
PASSIVE HOUSE: A Response to Climate Change

By Mike Duclos

The energy crisis of the 70s kicked off a renewed interest in using energy directly from the Sun to heat our homes. Energy prices soon retreated, as did most, but not all interest. Less expensive fossil fuel energy catalyzed our economy, further increasing energy consumption. Some looked to the future and predicted peak oil. Others looked further into the future and realized the real problem would not be running out of fossil fuel-based energy too soon, but too late.

Passive House is a German building design standard with technical origins in the US ‘passive solar’ experiments of the 70s, intended as a direct response to climate change, by capping annual energy consumption, with the side effect of resilience to disruption of the grid by the forces of the changing climate.

Germany embraced the Passive House standard by creating substantial subsidies for each square meter constructed to the standard. This has catalyzed their local industries to create advanced windows, mechanicals, insulation, and air sealing systems, which have become ‘the new normal.’ They are now in the position to export these technologies, further bolstering the ‘new normal.’

The mission of the Northeast Sustainable Energy Association – nesea.org – is to promote sustainable energy practices in the built environment. The NSEAA Building Energy Masters Series is an extraordinary series of online educational opportunities for all interested in outstanding buildings.

These courses run the gamut from the underlying physical principles which should (but so often are not) used to design, construct, and commission our buildings, to ‘keeping track of what actually happens to the energy and indoor environment. These extraordinary learning opportunities include Marc Rosenbaum’s popular Zero Net Energy Design, and the newest offering from Andy Shapiro and Building Energy Analytics.

cont’d p.30
EMERGING FRONTIERS IN BIOENERGY R&D INVESTMENTS TO INVEST IN GROWING GRAINS IN THE NORTHEAST

By Deb Heleba

Farmers throughout the Northeast have been growing grains for animal feed on dairy farms for years, although cereal grains have not been grown on a large scale since the 19th century. Back then, wheat and other grains were large parts of the agricultural economy; in fact, in the 1880s, Vermont had been dubbed the “bread basket of New England” because of its high production of wheat. Within the last 10 years, demand for locally grown grains of all types—from wheat and oats to barley and rye—has drastically increased across the Northeast due to interests in producing more home-grown livestock feeds and diversifying farm products to meet growing consumer demands for local products. As a result, farmer organizations, local mills and malt houses, and on-farm research trials have been sprouting up to support the renaissance of a small grains industry in our region. One example is the Northern Grain Growers Association. Created in 2004, the association of farmers, bakers, agriculture service providers, and local food enthusiasts encourage and support the production, processing, and marketing of grains in Vermont and the surrounding regions. The association works closely with researchers at the University of Vermont Extension, and together we have worked to rebuild a grain industry in Vermont. Some accomplishments include the following:

- Hundreds of grain varieties have been evaluated under the climatic conditions we experience here in the Northeast; these have included commercially available wheat varieties as well as heirloom wheat, barley, and oats.
- Numerous on-farm research trials have been conducted to identify optimum weed control strategies, fertility management, and planting dates for these grain crops.

Durum wheat was the wheat most commonly grown in ancient Israel. Image from wikimedia

Vermont sunflowers growing. They support both energy and local food sectors in Vermont. Photo: Vermont Bioenergy Initiative

PASSIVE HOUSE: A Response to Climate Change

Cont’d from p.29

Passive House Design, another Building Energy Masters Series course beginning next on May 4, explores the history, development and practical applications of the passive solar design experiments of the 70s; into the Passive House Standard. In the US, William Shurcliff, a physicist at Harvard, analyzed the thermal properties of building materials as public testing surveys to assess consumer preferences of local wheat varieties. Traditional, participatory breeding of five wheat crosses—some using the germplasm from 19th century varieties bred by VDL botanist Cyrus Pringle—have been implemented. These crosses have been grown out on-farm for more than six years where farmers have been improving them through annually selecting for favorable traits. A public release of these varieties may occur in 2015—the first wheat varieties developed in Vermont since 1901.

Visit the Northwestern & Soils Program at www.uvm.edu/extension/crops/bioenergy. Similar farmer-to-farmer, farmer-to-baker, and farmer-to-researcher partnerships have formed throughout the Northeast region, including New York and Maine, all with the goal of supporting locally grown grains.

Grain trials and research have also been instrumental in the local production for local use biodiesel. A biorefinery model development developed by the Vermont Bioenergy Initiative, UVM Extension research and collaborations with farmers active in the Northern Grain Growers Association have helped to identify the grain varieties which grow best in the Northeast that are rich in oil content which can be converted to biodiesel to supply fuel to farm equipment and feed for livestock. Learn more at www.vermontbioenergy.org.

Deb Heleba is Sustainable and Organic Agriculture Program Coordinator, University of Vermont Extension.

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Vermont sunflowers growing. They support both energy and local food sectors in Vermont. Photo: Vermont Bioenergy Initiative

SUSTAINABLE AGRICULTURE

Re-using Greywater At Home

by Roddy Scheer and Doug Moss

Now that solar panels are so common place on rooftops across the country, reusing so-called greywater—that is, the waste water from sinks, showers, tubs and washing machine—for landscape irrigation may be the next frontier in the “greening” of the American home, especially if you live in an arid region where water use is restricted. In fact, reusing your greywater may be the only way to keep your lawn and garden healthy without taking monte irrigation fair share of the community’s precious freshwater reserves.

“Using water from sinks, showers and washing machines to irrigate plants is a way to increase the productivity of sustainable backyard ecosystems that produce food, clean water and shelter wildlife” reports Greywater Action, a California-based non-profit dedicated to educating and empowering people to use water sustainably. According to the group, a typical U.S. single family home can reduce water use by as much as 30 percent by installing some kind of greywater reclamation system while simultaneously reducing pollution into nearby water bodies by filtering out contaminant locally. Capturing and reusing greywater can also be part of the battle against climate change, given that you’ll be helping grow plants that sequester atmospheric carbon dioxide while reducing demand on a regional wastewater treatment facility that’s likely powered by fossil fuels.

The simplest way to get into home greywater reuse is by installing a so-called “dry-backyard” system that sends washing machine waste water outside via a diversion tank and hose that can be moved around to irrigate specific sections of the yard. Equipment costs for such a setup may max out at $200, but labor and expertise may tack on another few hundred dollars. Homeowners can do much of the work in setting up such systems themselves, though those without much home repair or plumbing experience might at least consult a professional.

Greywater Action suggests one way to reduce costs is by digging trenches for diversion pipes and mulch basins yourself—or enlist friends who want to support the effort and learn about residential greywater reuse in the process.

A more comprehensive system can draw wastewater from sinks, showers and tubs, too—and then filter and distribute it to backyard landscaping via a drip irrigation network. Getting such a system professionally installed can run upwards of $5,000. Either way, once the greywater diversion system is in place, you’ll need to be careful about what goes down the drain, given the ways in which it might affect the plants and soils right outside. In any greywater system, it is essential to put nothing toxic down the drain—no bleach, no dye, no bath salts, no cleanser, no shampoo with unpronounceable ingredients, and no products containing boron, which is toxic to plants; adds Greywater Action.

For more information on installing a greywater reuse system yourself, check out the resources section of Greywater Action’s website, where you’ll find diagrams, written instructions and even videos to make the job go smoother. Those more inclined to hire a professional can browse through listings of qualified installers across the country. And if you want to see how it’s done first-hand, sign up to attend one of Greywater Action’s workshops on how to install a greywater catchment and diversion system in a residential setting.


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

Photo: Vermont Bioenergy Initiative

Using “greywater” from sinks, showers and washing machines to irrigate outdoor gardens is a great way to increase the productivity of backyard ecosystems while reusing household water use by as much as 30 percent. Pictured: A backyard garden watered with residential greywater. Credit: Jeremy Levine, courtesy flickr
Rain Gardens

Ensuring clean runoff for homes, businesses, roadsides, lakes, streams, wetlands, and parking lots ...

DESCRIPTION:
Rain gardens are attractive and functional landscaped areas that filter rain runoff.

PURPOSE:
Rain gardens are designed to capture and filter runoff from paths and impervious surfaces. They collect water in bowl-shaped vegetated areas, and allow it to slowly soak into the ground. A rain garden reduces the potential for erosion and minimizes the amount of stormwater flowing from the lawn and impervious surfaces into lakes.

HOW TO INSTALL A RAIN GARDEN:
Rain gardens can vary in size, but are most effective when built to 20-30% of the drainage area. Rain gardens for single-family homes will typically range from 150 to 300 square feet, but even a smaller one will help reduce water pollution problems.
• The garden should be a shallow bowl-shape, with the lowest point of the garden no more than 6” below the surrounding land.
• The sides should be gently sloping towards the center to prevent sudden drop-offs that could lead to erosion problems or walking hazards.
• Rain gardens are often placed in a preexisting or created depression within a lawn, or in a location that receives roof runoff from a downslope.
• To avoid flooding improperly sealed foundations, build your rain garden 10’ away from existing structures (including septic tanks), and direct water into the garden with a grassy swale, French drain, gutter extension or other device.

Rain gardens can be placed in sunny or shady regions of your lawn. Plant the lowest point with wet tolerant species, then use the most tolerant species for the sides closest to the center and the edges of the rain garden should be planted with moist to dry or dry tolerant plants. It is also important to check the permeability of your soil. Sandy soils only need compost added, but clay soils should be replaced with a mix (50-65% sand, 15-30% topsoil, 2-30% compost). After construction of the garden is complete, the entire area should be covered with a thick layer of mulch.

DESIGN GUIDANCE FOR PLACEMENT:
To test the drainage of the possible rain garden location, dig a 6-8 inch deep and wide hole and fill with water. If the water does not drain within 12 hours, the location is not appropriate for a rain garden. Rain gardens should be placed where their potential can be maximized. For example, although placing a rain garden under a mature tree will intercept runoff, the tree is most likely taking up more water than the garden would take up; therefore, a rain garden is unnecessary in this location. Also, do not locate a rain garden where there is existing vegetation that would need to be cleared.

MAINTENANCE:
Overall, once plants mature, the maintenance of a rain garden is very low. Watering is important during the first growing season, and some weeding is necessary after planting. As the garden matures, some of the perennials may need to be divided if plantings become too crowded.

LAKE BENEFITS
Rain Gardens capture and treat stormwater flowing from the lawn or impervious surfaces and prevent it from entering the lake or other waterways.

MATERIALS
Replacement soil mixes and Erosion Control Mix are available at local garden centers. Native plants can be bought from your local nursery. Please see Planting and Renaturalizing Areas from this series for planting specifications. Do not use fill that may contain invasive plant material.

Links:
And The Vermont Rain Garden Manual developed by the Winooski Natural Resources Conservation District: http://www.uvm.edu:8889/~seagrant/community/docs/sw_LID%20Guide.pdf

A small rain garden with native plants captures and filters runoff from rain events. Source: Vermont Low Impact Development Guide for Residential and Small Sites.

Rain Garden in a neighborhood setting

Plant Choices
Choose native plants based on need for light, moisture, and soil. Vary plant structure, height, and flower color for seasonal appeal and butterfly habitat.

Size
A rain garden is typically 5 to 10% the size of the impervious surface that generates the runoff.

Depth
A typical garden is between four and eight inches deep. This depth, proportionate to surface area, helps assure water will infiltrate quickly and not pond.

Soil Amendments
A good soil mix for rain gardens is 65% sand, 15% topsoil, and 25% compost.

Adapted from illustration by Doug Adamson. Source: www.sleepycreekwatershedassociation.org
The Wells Reserve at Laudholm is Now 100% Solar

The Wells Reserve at Laudholm, in Wells, Maine. Aerial photovoltaic array of the solar array on the Maine Coastal Ecology Center building. Photo: Flickr.com

The Wells Reserve at Laudholm in Wells, Maine, is the first nonprofit in the state to meet 100 percent of its electricity needs with solar energy. Over the past two years, the reserve installed 248 solar panels that are expected to generate 73,000 kilowatt-hours of electrical energy while preventing 45 tons of carbon from entering the atmosphere each year.

“This action moves us toward full energy independence, lightens our carbon footprint, and sets the bar for Maine's nonprofits and business community,” said Nik Charov, president of Laudholm Trust. “We want this project to show Mainers this can be done. The science is clear on what is happening to our world and the solutions to our climate problem are right in front of us. Maine has the capacity to reach for energy independence and a sustainable future.”

Paul Dest, director of the Wells National Estuarine Research Reserve, led the reserve's effort to conserve energy and convert to renewable sources for electricity. “We set some aggressive goals and in less than 3 years we met them. Cutting our energy costs is a tangible reward that strengthen our science, education, and conservation programs.”

“More importantly, we are doing our part to reduce carbon emissions, taking a critical step toward limiting climate change,” Dest added.

U.S. Senator Angus King (I-Maine) was on hand for the announcement.

“With rising seas and warming waters, estuaries serve as valuable barometers for monitoring the mounting effects of global climate change,” said Senator King, a member of the Senate Energy and Natural Resources Committee. “So it is only fitting that the Wells Reserve at Laudholm, a valuable part of NOAA's national network of estuarine research reserves, is also at the forefront of the important transition to renewable energy sources and the fight against climate change. This major solar power milestone will help combat climate change by reducing oil consumption and curbing carbon emissions, helping to protect and preserve this treasured area in southern Maine for generations to come.”

The reserve's $200,000 investment in solar infrastructure was made possible by grants from the National Oceanic and Atmospheric Administration, the Mattina R. Proctor Foundation, and the Davis Conservation Foundation, with additional support from the Town of Wells and generous donors to the Wells Reserve at Laudholm. The reserve also received rebates through Efficiency Maine.

The four solar arrays, installed by Portland-based ReVision Energy, “helped us accomplish our initial goals, but we're not done yet,” said Dest. “As we grow we want to ensure that all our power needs are met through renewable resources.”

The Wells Reserve at Laudholm is a National Estuarine Research Reserve with its headquarters listed on the National Register of Historic Places. The reserve serves as a center for research, education and training, land stewardship and conservation, as well as preservation and protection of a sustainable future. Learn more about the Wells National Estuarine Research Reserve at wellreserve.org/solar or call 207-646-1555.

Wells Reserve Hosts Workshop on “Blue Carbon” Science

Scientists from around New England met at the Wells National Estuarine Research Reserve on December 5, 2014, for a workshop focused on “blue carbon” science and policy. For the first time, scientists from throughout the region gathered to share research results, identify gaps in knowledge, and plan future collaborations involving carbon in coastal habitats.

The term “blue carbon” refers to the ability of salt marshes, seagrass meadows, and mangrove forests to take up and store carbon dioxide and other greenhouse gases from the atmosphere. Coastal wetlands capture carbon and store it at rates even greater than rainforests.

“Carbon held naturally in coastal wetlands is not entering the atmosphere as a greenhouse gas, so these habitats have real potential to mitigate climate change,” said Dr. Kristin Wilson, Wells Reserve research director, who co-coordinated the workshop.

The Harris Center has collaborated with ConVal School District classroom teachers to provide a wide range of environmental programming for more than four decades. Elementary students explore the environment around their schools, sixth-graders learn about climate and agriculture, eighth-graders study forest ecology, and sophomores do an invasive plant survey. As part of this continuum of programs, freshmen learn about what is involved in a building energy audit as an applied component of the high school science curriculum’s focus on energy transfer. Last year, ConVal freshmen studied the nooks and crannies of an empty farm house. This year, they turned their focus to the Harris Center itself.

Janet Altobello, Harris Center teacher-naturalist worked with Ted Stiles, a Harris Center adjunct teacher and an energy auditor with Yankee Thermal, and ConVal earth science classroom teachers, such as Dana Wood, to teach the students about a building energy audit and then apply what they learned to the real-life situation at the Harris Center. Students made observations with their eyes and hands, and also with tools, such as thermal imaging cameras and air pressure gauges, as they evaluated the building’s design and performance.

Through the course of the audit, students visited and made observations at six stations located throughout the building. These stations included typical high-problem areas such as the basement and attic, an outside reconnaissance, and some that examined some of the “greener” features of the building. Ted Stiles showed them how to use a blower door test to determine how airtight a building is and expose where the worst leaks occur. Janet taught them how to test the interior temperature of single-, double-, and triple-pane windows. In other areas, they applied their math skills to determine how much water the Center’s composting toilets save, or calculate how much forest area is required to sustainably grow the amount of wood used to heat the building in the new pellet boiler. They found it was nearly 20 acres.

Ultimately, the work of the Harris Center and local teachers is to provide lessons that connect curriculum concepts to students’ everyday life. “We’re trying to do things with the kids where they can say, ‘I can do this at my house, or I know how to make my house more energy-efficient,’” says Altobello. Using the Harris Center building as a teaching tool allows this to happen.

And though the Harris Center was only renovated 11 years ago, students were finding areas that could be tightened up — the result of over time, the design and construction, problems caused during post-renovation repairs, and general settling of the building. The energy audit classes will continue this spring, so the Center doesn’t have the final results and recommendations of the audit yet, but they’re eager to apply what the students learned to advance the Center’s sustainability. Stay tuned!

To learn more, contact the Harris Center at (603) 525-3394.

Jeremy Wilson is the Executive Director and Margaret Baker is the Communications Specialist for the Harris Center for Conservation Education in Hancock, NH.
The Earth is over 4 billion years old, and in those 4 billion years, modern humans have only been around for 200,000 years. The early Earth was devoid of oxygen, but full of carbon dioxide. This environment could not possibly sustain any life. But, eventually, primitive life forms such as Sino and Archio bacteria formed. They endured the harsh climate, feeding off of the energy produced by the sun. Over time, these organisms altered the atmosphere, broke up molecules, and filled the atmosphere with oxygen. This slowly changed the environment into one that could sustain life. Humans lived peacefully, causing little harm to their environment nearly 3 billion years later. But in the last few centuries, the damage to the Earth has been extensive.

Increase in CO2 in our atmosphere: Past Humans are constantly striving to do better. We have created technology beyond anyone’s imagination. We have landed people on the moon, even have landed a probe on a comet. But all of these advancements in technology are taking their toll on the Earth. The Earth has a protective layer that surrounds it known as the ozone layer. When fossil fuels are burned, they produce harmful chemicals, including CO2, which eat away at this protective layer. This allows the Sun’s harmful rays to get through easier. Usually the majority of the rays would be absorbed by the ozone layer, but due to the destruction of the ozone layer, these harmful rays are getting through easier, heating the Earth up. This is what most people refer to has global warming. Natural gas, coal, oil, petroleum, etc., are all responsible for the pollution of the Earth. But what if we found energy from clean sources, such as solar energy?

In conclusion, the rising CO2 levels are very alarming. But it isn’t too late for humans to clean up their act. They can stop using so much fuel and put solar panels on their roof. This would power a great efficient Earth, they would not only be helping themselves, but also their children, and even their children’s children. Solar energy in my opinion would be the best way to go because it is, for a fact, efficient, cheaper, and easily accessible.

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350-Vermont: General group that coordinates a variety of statewide actions.
To join this group go to: groups.google.com/group/350-Vermont
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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
VIPRG: understand the clean energy resources available to VT - www.viprg.org/eereenergyguide
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• Live both in numbers and in a manner that allows present and future generations of all life in that area to enjoy a healthy habitat over the long term.”
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**It's a Green Life ... After All**

**Ingredient of the Month**

**BRAIN HEALTH 102**

By Larry Pleasant

As promised, here is part two of the Brain Power series. This month we focus on omega 3 and omega 6 edible oils. These are the cod liver oils they gave to give your great grandmother when she was a kid. The oils were supposed to be a preventative for nearly everything that ails you. Turns out they were pretty much spot on.

Every mammal on earth has enzymes to re-manufacture various types of food oils (oils are also called fatty acids) that the body requires to work properly. And one of the body parts which require these oils is YOUR BRAIN. Some current thinking suggests that most humans on earth vanished about 70,000 years ago during a 10-year volcanic-induced winter that was followed by a thousand years of ice age. According to this idea, all humans alive today may have had descended from the handful of survivors from those times; which shows how closely related we all in fact are.

Humans lost the ability to manufacture two types of necessary oil molecules during this turbulent era. This forced us all to ingest them from food or become sickly, depressed and forgetful. “What was I just talking about?” Because you need them and must eat them, these oils are called essential fatty acids, or EFAs. Now that you know this you can adjust your diet or supplementation to compensate and move on to the next great adventure.

Land and sea insects make a lot of EFAs, and critters that eat them pass them on up the food chain. That is why eggs from hens allowed to roam free and supplement their diet with bugs are much healthier for us. Fatty, cold water fish like cod, salmon and trout have a lot of EFAs in them too.

People who like to take supplements should consider krill oil. Five or six tiny microcapsules a day provide an excellent buffer for your brain health. Because they are so small and potent, krill oil capsules are easy to swallow and easy to digest.

Vegetable-based alternatives include flax and hemp seed oils. Like the animal based products, these oils degrade quickly with exposure to air, light and warmth. Keep oil-based supplements refrigerated regardless of their source, and never buy liquid flax or hemp seed oils that were not refrigerated in the store, as they will spoil rapidly upon opening. Capsules bypass all this by cutting off the oxygen in the air from getting at the oils.

Our settler ancestors ate salmon several times a week (or more) and all eggs were “free range!” Also we suspect they ate more than a few insects when they had to. Essential fatty acid deficiencies are a widespread problem in modern societies. Are YOUR children eating ANYTHING that contains these health-giving oils? If the answer is, probably not, then supplement their modern stripped-out diet with fish and with oils. Their brains will thank you for it.

An important thank-you to Woody Allen for reminding us all that your brain should be your second favorite organ too.

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

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**Safer and More Effective Sunscreens**

by Roddy Scheer and Doug Moss

Skin cancer is by far the most common form of cancer in the United States, with more new cases each year than breast, prostate, lung and colon cancers combined. And the rate of newly diagnosed cases of the most deadly skin cancer, melanoma, has tripled over the last three decades. But many of the sunscreens on the market do not provide enough protection from the sun's damaging rays. Also, some of them contain chemicals that can also cause health problems in their own right.

According to the non-profit Environmental Working Group (EWG), which assessed the safety and effectiveness of more than 1,400 “SPF” (sun protection factor) products for its 2014 Guide to Sunscreens, only one in three sunscreens for sale on the shelves of American stores offer good skin protection and are free of ingredients with links to health issues.

“One means two-thirds of the sunscreens in our analysis don’t work well enough or contain ingredients that may be toxic,” reported the group.

A big part of the problem is the lack of tougher rules from the U.S. Food and Drug Administration (FDA). “The FDA’s first major set of sunscreen regulations, 36 years in the making, took effect in December 2012 and proved far too weak to transform the market,” reports EWG. While the new rules did restrict some of the most egregious claims on sunscreen labels (such as the “patently false” “waterproof” and “sweatproof” claims) and ended the sale of powder sunscreens and “towellettes” that were too thin to provide protection against ultraviolet rays, they didn’t address inhalation threats from spray sunscreens or take into account the risks of exposure to so-called “nanoparticles” from zinc oxide and titanium dioxide varieties.

While the FDA is currently reassessing its stance on sunscreens, EWG warns it may be a while before new rules address these and other concerns, especially given push-back from regulatory-averse members of Congress and some manufacturers.

So what’s a health-conscious sun worshipper to do about sunscreen?

For starters, read labels. Some common sunscreen ingredients to watch out for and avoid include: oxybenzone, which can cause allergic reactions and hormone-like effects; vitamin A (AKA retinyl palmitate), a skin irritant and possible carcinogen; and fragrances which can contain allergens and chemicals. Also, spray sunscreens are suspect because inhaling some of the ingredients can irritate breathing passages and even potentially compromise lung function. And EWG warns to avoid products with SPF ratings higher than 50, as their use can tempt people to apply too little and/or stay in the sun too long. Sticking with products in the 15-50 SPF range and reapplying often makes much more sense.

Some of the best choices are those sunscreens that employ either zinc oxide or avobenzone, both of which have been shown to block the most damaging ultraviolet rays effectively without the need for other potentially troublesome additives. Some of the leading brands that meet EWG’s criteria for both safety and effectiveness include Absolutely Natural, Aubrey Organics, California Baby, Elemental Herbs, Goddess Garden, Tropical Sands and True Natural, among others. Find these and other winners on the shelves of natural foods retailers as well as online. For a complete list of all 172 recommend-ed sunscreens and to learn more about the risks, check out EWG’s free online 2014 Guide to Sunscreens.


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**4 Pesticides You Might Be Eating**

By Davis Jones

Yeah, we are what we eat, but an Amy isn’t an amitraz, and a Ted shouldn’t be a tetrachlorvinphos. It’s an unfortunate truth that many of our favorite fruits and vegetables contain pesticide residue. Even more unfortunate is how consumers are expected to decipher the health effects themselves. To help, we’re naming a few pesticides sometimes found on your favorite produce. Some of our recommendations have great organic alternatives, which means you don’t have to stop eating your greens (sorry, kids — both your own mother and Mother Earth will approve).

1. Grapes: Chlorpyrifos
   Smell rotten eggs? You might be getting a whiff of this organophosphate insecticide, which was re-registered by the US EPA in 2006. While it is not toxic in its original state (white/colorless crystals), chlorpyrifos actually becomes toxic once your body processes it, taking a new form called chloryrifos oxon. What’s particularly alarming is the insecticide’s studied effects on children — one study showed that babies born with chlorpyrifos in their systems by way of their mothers’ blood displayed increased signs of development delays, attention deficit disorders, and hyperactivity disorders than babies without chlorpyrifos in their bloodstreams.

2. Spinach: Permethrin
   This insecticide keeps a lot more than mosquitoes away; Permethrin has proven highly toxic to wildlife like honeybees and fish. It’s obnoxiously tough to get rid of once it comes into contact with the sediment of aquatic systems, and it can remain absorbed in sediments for more than a year. Also, Permethrin has been classified by the EPA as “likely to be carcinogenic to humans” when it is ingested.

3. Apples: Carbaryl
   We’d like to bet that your favorite apple variety doesn’t involve la saveur de pet-care product. A 2008 study by the US EPA estimated that this chemical was treated on roughly 40% of the nation’s apple crop per year. Because it is designed to disrupt the nervous systems of insects, young, growing children may be susceptible to negative long-term health effects. All of our favorite apple producers can thankfully breathe a little easier for your pets, as the US EPA announced in 2009 that flea collars would no longer include carbaryl.

4. Sweet Bell Peppers: Methamidophos
   Bell peppers Sometimes used on peppers grown in other countries, methamidophos has displayed the ability to slowly eat away at mild steel and copper alloys. This insecticide is rapidly absorbed by humans once you touch it, taste it, or smell it. Much work has been done to limit its worldwide use, because there’s nothing sweet about overstimulating the nervous system for the sake of stimulating your taste buds.

Davis Jones is an editorial intern at Sierra. His love for the outdoors began when he stepped on a fish hook as a 12-year-old and cried, in a burst of epiphanic clarity, “I’m too young to die.” He attends the University of San Diego and enjoys camping, hiking, backpacking, and other activities that more or less benefit the mosquito population.
On Saturday, May 16, Stonyfield, the local organic yogurt maker, and LOCO Sports, will host the fifth annual Stonyfield Earth Day 5K & Fair. The event will be from 10 am to 1 pm at the Stonyfield Yogurt Works, 10 Burton Drive in Londonderry, NH. This family-friendly road race and fair is open to the public so all can join the fun! Rated one of the top ten 5K races in New England with about 2500 runners and 4000 attendees at the free fair, this is one opportunity locals won’t want to miss!

Runners and walkers should sign up early to take advantage of new offers. The first 1400 pre-registered 5k entrants get an Adidas custom tech race tee. The first 200 kids to register for the children’s race will get free passes to The NH Children’s Museum and a pass to Charmingfare Farm.

Smuttynose will bring their well-known race beer tent (non-runners must pay for beer). Complementing that will be free local pizza at the Rustic Crust pizza truck. A Market, Applegate, Pete and Gerry’s Eggs and Pretzel Crisps will provide free, healthful food.

Pat and The Hats, a local-to-New Hampshire band, will play live music for the duration of the fair. Frank FM (106.3) and 105.5 JYJ will broadcast live all day. The “Bunny Hop” will return this year, to bring attention to the endangered New England cottontail rabbit. Stonyfield will donate a portion of race proceeds to help support species conservation efforts.

NH Roller Derby, a non-profit sports organization, will provide a demo for fair goers. Kids will be able to enjoy a whole array of fun things, including face painting, laser tag, a chance to meet Gurt the Stonyfield Cow and several other mascots, and much more.

A dedicated runners’ tent will be on site, complete with three chiropractic prac-

Many thanks to our Sponsor:
With our highlights on Montpelier’s goal as the first net-zero capital in the country, we thought it was fitting to include a Montpelier landmark for our dining in the green feature. In this exemplary city in Vermont you will easily find NECI on Main, located at 118 Main Street. NECI on Main is now a charter member of the Green Restaurants in the Green Mountain State (GRMS) advancing to the Environmental Leader designation by meeting eight core environmental standards.

NECI on Main has developed an Environmental Action Plan to minimize the environmental impacts of business operations, using many different practices to “green” their business. For energy conservation, these include lighting upgrades, purchase of Energy Star appliances and refrigeration equipment, heating system upgrades, and improved weatherization. Water conservation methods include low-flow dishwashers, sinks, and toilets. Resource conservation and sustainability is achieved through bio-based dinner and to-go ware, buying locally sourced products, maximizing reuse and recycling, collection of plant materials and food waste for composting, and the use of green cleaners and post-consumer recycled paper products.

NECI on Main is an award-winning fine dining restaurant featuring locally grown, sustainable, farm-to-table fare. Some of the measures it has taken to achieve Green certification are composting more than five tons of kitchen prep and plated waste each month, totaling approximately 500 tons of compost since inception of the program. Philip Stevens, the digital content coordinator for the restaurant, described their policy more as being “chronic composters.” They recycle 600 pounds of plastic bottles and aluminum cans, and more than 1,000 pounds of cardboard each month. Incandescent light bulbs have been replaced with LED bulbs. They changed refrigeration motors to energy-efficient models, and installed two new induction cooktops, saving in excess of 7,500 kWh each year. Additionally, as a Vermont Fresh Network founding partner, NECI on Main is well proven in its local food movement, not only supporting Vermont farms but significantly reducing its carbon footprint.

NECI on Main is a production lab for New England Culinary Institute. The New England Culinary Institute was founded in 1980, and is widely recognized for its innovative immersion style of education featuring small classes, hands-on learning, and personal attention. Its graduates are sought after for their level of skill and preparation.

Imagine the entire state of Vermont as a food experiment or as its own laboratory where food products are grown and created for this particular climate; seasonally, organically, and sustainably. For 30 years they have been teaching students to make connections with farmers, between the landscape and food, and between seasons and culinary traditions. Sometimes they include food items that express a particular sense of place from outside Vermont, or culinary traditions from other cultures, and use those items or experiences to enhance the foods grown here in Vermont. Their menu is no exception in this teaching philosophy, and reflects the best that Vermont’s farmers, and America’s next generation of young chefs have to offer.
SUTHERLAND WELLS ON MY DECK

By N. R. Mallery

My deck was built twelve years ago. Since that time I have used a number of finishes on it, none of which was satisfactory. The last one I used was put down three years back, and I was so disappointed that I power-washed it off. The cedar wood of the deck was weathering and wearing in ways that I did not want to permit, and so I turned to Mary Goderwis of Sutherland Welles, Ltd., in North Hyde Park, Vermont, for help. Aside from the fact that I had been impressed by their products for other applications, I prefer doing business with local companies.

I got some Sutherland Welles’ Exterior Polymerized Tung Oil. Going from my weathered deck to a beautiful finish was not going to happen just by applying the oil, of course, so I started by cleaning the deck, preparing it for the application of oil, exactly according to the Mary’s instructions, and were online, too. The first two applications had their stain mixed in for color. Sutherland Welles has a number of stains to choose from so I could get the exact color finish I wanted. I chose a warm pine color, with Mary’s help. This was mixed with the tung oil, again with care to follow instructions. The final coat was just the tung oil. All coatings were cured accordingly. The tung oil also had two additives for protection of the finish, one being protection against the harm of ultraviolet light, and the other a material called “mildeweide.”

I should start by saying that my house has a lot of beautiful wood exposed, and this makes it very important to me that it has a natural wood finish look. The process of applying the tung oil was accomplished in three sessions with appropriate curing periods in between. When the tung oil was newly finished, it looked and felt exactly as I had wanted. It had taken a deck that was in need of a lot of work and made it something to be proud of. Neighbors marveled at the change. And, I could feel very good about having a natural finish on my deck.

This winter was brutal, and had the advantage of providing an absolutely perfect product test. Anything that could stand up to the elements in such a winter clearly has some impressive advantages. Now, having gone through a winter of watching to see how the tung oil finish stood up, I can give a report on it. It looks exactly as it did last summer, except that it might have a slightly more natural appearance.

I would highly recommend this product to anyone who loves the appearance of wood and wants to protect it. Sutherland Welles not only has a great product, but also easy to follow instructions, and great support, if you need it. I’m hooked!

The website for Sutherland Welles is www.sutherlandwelles.com.

5th Annual 5K Run & Free Fair cont’d on p.36

tices, and massages for all by Seacoast Career School. Grace Limousines will provide shuttles to and from nearby parking lots.

General registration is $30 and tickets can be purchased from March 1 through May 12 midnight. Race day registration may be available, pending space. The Kids Race is for children 10 and under and is free; children can be registered at the fair. Affordable youth pricing for big kids over 10 is also available for $20 a ticket. Runners can head to http://stonyfield5k.com/ for more information.

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Six Ways to Control Weeds

By Jessica Barber Goldblatt

Weeds are many homeowners’ and gardeners’ biggest enemy. Roundup and other chemicals may seem like a weapon in the arsenal against weeds. However, they can leach into fruits and vegetables. They also run off and trickle down into groundwater. There are better, safer ways to prevent and control weeds before they take over. Here are strategies for preventing weed growth, and methods of controlling unwanted weeds.

1. Crowd out weeds with thick lawn cover. Keeping the lawn thick and healthy prevents room for weeds to grow. Re-seeding lawns in the fall, when many weeds are already dead, means less competition for space as grass seeds try to take root. Ground cover and thick plantings crowd out weeds in decorative beds.

2. Keep your plants healthy with fertile, aerated and well-drained soil. Carefully hoeing the topsoil can effectively control some weeds but should consist of short, shallow strokes that simply cut off the weeds at soil level.

3. Mulching garden beds is the most important factor in preventing weed growth. Nearly any barrier that blocks light works as mulch. Bark, dried leaves, straw, cardboard… Organic mulches improve soil structure, and add nutrients, keep the soil cool and moist.

4. Cover the ground with landscape fabric. They are typically made of plastic, but may also be sheets of burlap or other natural fibers, or recycled plastics, and are effective at blocking weed growth while allowing water and air into the soil. Use in conjunction with compost and mulch.

5. Keep an eye on weeds and pull them before they can go to seed to keep them from getting deeply established and spreading.

6. Vinegar and other organic herbicides aren’t all made of nasty chemicals. Organic soaps, plant oil blends and even common household products are all used as natural herbicides. While some research suggests vinegar, or acetic acid, is not always effective, other research shows drenching targeted weeds with vinegar can kill them, without any risk of toxic runoff. It is not selective, so beware that this means that it may kill everything it strikes.

In conclusion, none of these methods will work by itself, but vigilance, regular control of undesirable plants and proper care for desirable plants should minimize weed growth without the need for any chemical controls. Also consider controlling your reaction to weeds. Some homeowners and even experts suggest a live-and-let-live philosophy.

Jessica Barber Goldblatt is the owner of Interiors Green – the Home and Living Store at 2021 Main Street in Bethlehem, NH. www.interiorsgreen.com.
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