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## Fracked Gas: Worse than Coal

By Josh Fox and Lee Ziesche

A duplicitous and dangerous shift in energy is unfolding across our country. As part of the Obama Administration's climate plan, coal-fired power plants are being taken offline, which is fantastic- but in many cases the proposal is to replace them with natural gas power plants, a truly terrible idea that will force us to frack for decades. We need to replace both coal and gas with truly renewable energy- the wind and the sun. But unfortunately Obama's climate plan is a form of fossil fuel denial; it's out of the coal fire and into the fracked gas frying pan.

Replacing coal with fracked-gas-fired power plants is not a climate solution; it's a desperate attempt for the fossil fuel industry to extend its deadly stranglehold on our energy system. Faced with overwhelming science that proves continuing to burn fossil fuels will cause catastrophic climate change, the industry's new strategy to avoid extinction is to greenwash dirty fossil fuels.

The fracking PR machine has been feverishly peddling natural gas as a clean source of energy. They've made up the term "bridge fuel," claiming we can't get from coal to renewables without fracked natural gas acting as a bridge.



Josh Fox and Lee Zeische were arrested protesting fracked gas storage in salt caverns under Seneca Lake. Photo courtesy of 'We Are Seneca Lake.'

Let's be clear, when it comes to our energy future, there are two diverging paths and there is no bridge between them.

The industry likes to tout the fact that when burned, natural gas emits half the carbon dioxide of coal. That's true, but they fail to mention that methane, a very potent greenhouse gas, is also leaking at scary rates from every part of production and delivery which negates any climate benefit.

The reason is that methane is an extremely potent greenhouse gas; it is 86 to 105 times more powerful a warming agent over a 20-year period than carbon dioxide. And it is 33 times more potent over 100 years.

So that means that if there is greater than two to three% leakage, *cont'd on p.32*

## Do you understand what this means?

By George Harvey

### Will Tesla Change Our World?



Tesla Powerwall Battery. Courtesy of Tesla. Inset: Elon Musk. Photo by Heisenberg Media. Creative Commons Attribution 2.0 Generic license.

On March 30, Elon Musk, the CEO of Tesla Motors and Chairman of SolarCity, set a lot of people buzzing when he tweeted that Tesla would be introducing a new product line, but it would not be cars. Speculation centered on batteries, because he had started moving on the construction of a \$5 billion battery plant months earlier. It was assumed that a plant of that size was much too big to be intended to build batteries for Tesla's cars.

Then, on April 30, 2015, Musk announced that Tesla had three new lines of batteries for sale. For the home, there would be two "Powerwall" batteries,

a 7kWh battery priced at \$3000 and a 10kWh model at \$3500. An industrial-scale battery called a "Powerpack" would hold 100kWh, and be priced at \$25,000.

There were, of course, a lot of people whose reaction was, "Ho-hum. What could be interesting about batteries?" They did not understand the implications. But the response in many important places was astonishing.

Arnie Gundersen, well-known for his commentary on nuclear power, told an audience the Tesla battery was the final nail in the coffin of the nuclear industry. Even more surprising, an article appeared

in Forbes a few days later with the title, "Why Tesla Batteries Are Cheap Enough To Prevent New Power Plants." The excitement, however, was not just a bunch of words.

Tesla pre-sold \$804,000,000 worth of batteries in the first week after the announcement.

To understand why all the fuss is going on, a little background might be reviewed. Last year, analysts for Oncor Electric Delivery Company calculated the break-even point for utility-scale storage batteries at \$350 per kWh. Tesla's Powerpack, the big sister of the Powerwall

*cont'd on p.17*

## THREE DOWN ..TWO TO GO

By George Harvey

Among oil companies, there are five that stand out, traditionally called "Big Oil," and "the super-majors." Though there are other large companies, these five stand out for reasons of both history and economics.

Three of the five super-majors, together with three more huge oil companies that are not part of that group, sent out two letters on climate change at the end of May. One of these went to the *Financial Times*, and it makes the interesting statement, "We owe it to future generations to seek realistic, workable solutions to the challenge of providing more energy while tackling climate change."

While that seems rather stunning, the other letter, which went to the United Nations, says a good deal more. It begins with an admission that puts everything into unambiguous focus. "Climate change is a critical challenge for our world."

Unsurprisingly, the oil companies sing their own praises in various places in the letters. Nevertheless, they bring some

important issues to the table, with the express hope of entering into a dialog with the UN and "willing" governments.

"We believe that a price on carbon should be a key element of these frameworks," the oil companies say. With that, they are asking that charges for putting carbon into the atmosphere be made, raising the prices of the products they sell. Unsurprisingly, they ask that natural gas, which they sell, be used to replace coal, which they do not sell. And unsurprisingly, they advocate carbon capture and storage. But they also advocate increased use of efficiency, renewable energy, smart buildings and grids, and clean vehicles. One other thing they notably advocate is new behaviors.

The three super-major oil companies that signed the letter are Shell, BP, and Total, a French company. They were joined by Italy's Eni, Norway's Statoil, and one US company, BG Group. The two super-majors that did not sign the letter are Chevron and ExxonMobil.

### A Majority of Big Oil Wants to Act on Climate Change

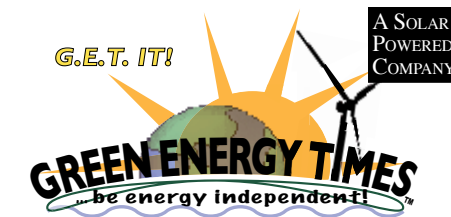
The significance of this development would be hard to overstate. The oil companies have gone beyond admitting that climate change is a real, serious, man-made problem. They have even gone beyond pointing out that it is important that they make a contribution to the solution. They have asked the nations of the Earth to be allowed to enter into a dialog, in which they can offer their

*cont'd on p.25*

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*Thank you all for your help!*

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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 your needs. We walk the talk!

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

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# C-PACE moves closer to reality in NH

By Laura Richardson

With Governor Maggie Hassan's signature on New Hampshire's House Bill 205, the Jordan Institute is preparing to launch what will soon become a statewide program to provide attractive financing for energy-efficiency and renewable-energy (EE/RE) projects in existing privately owned commercial buildings.

C-PACE, short for Property Assessed Clean Energy financing for Commercial buildings, addresses numerous obstacles that have made comprehensive EE/RE projects rare historically, especially in New Hampshire.

HB 205 originally sought to prohibit for-profit entities from participating in the program because of NH Constitutional concerns - municipalities providing loans to for-profit entities is counter to the intent of Article 5, Section 2 of the Constitution. Many C-PACE programs across the country provide financing through municipal bonds, taxpayer funds, or line items on energy bills. The NH C-PACE program is being designed to only use private investment, no public funds. That said, it is understood that publicly funded rebates and incentives will be very important to reduce capital costs for most C-PACE projects. With common ground found, interested parties rewrote the statute to eliminate the authority for NH's municipalities to provide project financing. This step was warmly received by legislators and passed both the NH House and NH Senate by voice votes and without any audible objections. Such unanimity is rare in these bodies and bodes well for rolling out the program.

After signing HB 205, Governor Maggie Hassan stated, "As we work to reduce energy costs and build a more affordable, reliable and innovative energy future, we know that a successful long-term strategy must include stepping up our energy efficiency efforts and supporting small-scale clean energy projects. New Hampshire's PACE program has the potential to boost local energy efficiency and clean energy efforts that are critical to reducing energy costs for municipalities, businesses and homeowners, and protecting our natural resources. House Bill 205 will make it easier for our municipalities to secure private financing for projects through this program. I thank Representative Carol McGuire,

legislators from both parties and advocates from the Jordan Institute for their support of this bipartisan legislation, and I am proud to sign it into law."

Municipalities that adopt the statute, RSA 53-F, create special assessment districts where commercial building owners can tie the EE/RE project financing to the property as a special assessment lien. This single step allows for numerous benefits including:

- repayment terms up to 30 years.
- non-accelerating payments at time of property sale.
- in some cases, it can be off balance sheet.

New Hampshire's C-PACE program requires certain quality-control standards to ensure that the energy savings from the project are more than the repayment, meaning that building owners will have better buildings and improved cash flow.

- An energy audit before the project starts will determine historic baseline energy use, appropriate energy projects, and the anticipated savings-to-investment ratio.
- Building commissioning during the project will ensure that measures are installed correctly.
- Energy use monitoring and verification after the project is completed will prove out that the project performs as designed.

These steps provide comfort to building owners and investors and will raise the bar on performance outcomes by the EE/RE contractor community.

Jordan Institute is working with selected cities to adopt the program in 2015 with the plan of having template language available this fall for Town-Meeting towns to consider adopting next March. By 2017, Jordan Institute expects the program to be available widely. Building owners, EE/RE contractors, and municipal officials interested in participating in this program should contact the Jordan Institute.

Jordan Institute is partnering on NH C-PACE with Sustainable Real Estate Solutions, the NH Community Development Finance Authority, and Resilient Buildings Group. For more information about the New Hampshire C-PACE Program, go to [www.jordaninstitute.org](http://www.jordaninstitute.org).

*Laura Richardson is executive director of the Jordan Institute.*

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## PIKA ENERGY'S INVERTERS SUPPORT TESLA BATTERIES!

# Pika was Ready for Tesla!

By George Harvey



A single inverter works with both solar photovoltaics and wind power this system in Gorham, Maine. Photo courtesy of Pika Energy.

Pika Energy is a company that started up about five years ago near Portland, Maine. It was founded by two engineers who met while they were studying at MIT. The company is focusing on the design and manufacture of equipment that is particularly suited for microgrids. They are also working primarily with small systems, especially those that would be of interest

to homeowners and people who run small businesses.

At the heart of the microgrid is a technology they call Rebus™. This is what they call an "energy operating system." It allows a number of inputs, from different kinds of electrical sources, to be connected with a variety of different loads and storage interfaces. The same wires used to transmit power also conduct information among the pieces of equipment, providing a level of intelligence that rises above other systems.

The Rebus system operates at 380 volts, providing a level of efficiency that is unmatched in small systems. This means that power can be distributed over much longer distances than had previously been used. Multiple conversions between AC and DC power, each of which reduces the efficiency of the whole system, are also eliminated. An additional benefit is that the wire used for the system can be lighter, and therefore of lower cost, than wires of typical DC systems.

At the heart of the system is an inverter. Pika's first model is the impressive X3001 Hybrid Inverter, which is particularly suited to grid-tie systems. It's bi-directional Incoming power from the grid can be converted from AC, 240 volts to DC, 380 volts and sent to a battery charge controller. Incoming power from wind turbines can similarly be converted from DC to AC,

to power lighting and equipment. Solar panels, micro-hydro, and other power sources can be handled similarly. And all these operations can happen simultaneously. The X3001 inverter is rated at three kilowatts and weighs about 26 pounds.

The announcement of the new Tesla Powerwall batteries seems to have come as no surprise to the people at Pika Energy. When Elon Musk announced the Powerwall, Pika announced the equipment they would provide to support it. Pika's new product is a 7.5 kW grid-tie inverter with islanding capabilities. It provides an all-in-one solution for small microgrids that had multiple electrical sources, such as wind, solar, and others. The technology allows the energy produced at the home can be used, stored, or sold to the grid.

Pika Energy President Ben Polito said, "Tesla's announcement of an affordable battery solution for homes is an exciting development in the home energy industry." He added "It highlights the need for intelligent, bi-directional inverter solutions, and Pika Energy's inverter products fill that gap. Our microgrid product suite perfectly complements high performance batteries with affordable, smart electronics, to capture and manage clean energy to power our homes."

Learn more at Pika's website, which is [www.pika-energy.com](http://www.pika-energy.com), or you can reach them at 207-887-9105.

## GMP to offer Tesla home Batteries!

Distributed storage solution will increase resiliency and deliver reliable, cost-effective energy solutions to customers

Green Mountain Power has announced that it will be one of the first energy companies in the country to offer Tesla's new home battery, the Powerwall, to customers. Tesla, best known for its groundbreaking, fully electric cars, is taking its electric energy storage expertise to the next level with this energy storage solution for the home.

This exciting innovation in battery technology is part of delivering on Green Mountain Power's mission to deliver cost-effective, low carbon and reliable energy solutions for its customers. The technology will empower customers to become more energy independent while also allowing the company to reduce peak demand on the system, providing cost savings to all of its customers.

"We are excited to bring Tesla's Powerwall to our customers. The Powerwall offers greater energy independence for customers, and offers GMP an opportunity to reduce peak demand on our system, which saves our customers money," said GMP President and CEO Mary Powell.

"This is a great example of how GMP, as Vermont's Energy Company of the Future, is empowering customers to have more control over their energy choices while saving money and increasing reliability."

The Tesla home battery can be paired with small-scale solar systems, such as

rooftop panels, to store locally generated energy, or it can be used without solar as a battery to store power from the grid. During a storm or emergency, the battery is able to power essential parts of the home such as lights, a refrigerator, and furnace. GMP will partner with customers to utilize the batteries during peak energy times to lower costs directly for customers by reducing transmission and capacity costs.

"This is a great example of how Vermont is leading the way with real-world solutions to a more sustainable future," said Powell. "We want to create a new definition of resiliency, where we move away from the 100-year-old grid system to a new electric system where energy is generated and used closer to home."

GMP will begin receiving Powerwalls in October and rapidly deploy them to customers in Rutland, the Energy City of the Future, and then statewide. GMP will partner with customers by offering product incentives combined with on-bill financing to ensure customers can access these products and deliver the full value they bring to the grid.

"This is another important step in putting Vermont and Rutland on the map as energy leaders," said Rutland Mayor Chris Louras. "We have seen some devastating storms in the city, including Tropical

Storm Irene and the Nor'easter, and we appreciate all the work GMP is doing to help increase reliability and resiliency in our community through energy innovation, as with this new Tesla home battery offer."

To learn more about the Tesla batteries, go to <http://bit.ly/Tesla-battery>.

For more information go to [bit.ly/GMP-powerwall-overview](http://bit.ly/GMP-powerwall-overview).



Single Tesla battery. Photo courtesy of Tesla.

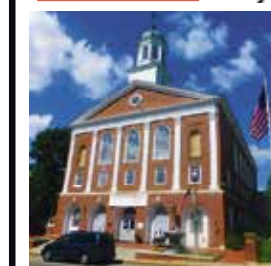
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# SOLARIZE Dummerston

OPEN HOUSE IN  
DUMMERSTON, VT

Solarize Dummerston Open House  
Tuesday, June 30, 2015  
6:00 to 8:00 pm  
Dummerston Grange.  
All are invited.

Please tell your friends, and neighbors!

The Dummerston Grange is at 1008 East-West Rd. You can see where this is by visiting <http://bit.ly/find-Dummerston-Grange>.

There will be multiple areas set up in the Grange Hall, both upstairs and down, with space reserved for each installer to have a presentation area, as will financial institutions, local banks and credit unions.

The installers will have a 15 minute presentations in their area to allow leads to cycle through each presentation, followed and preceded by opportunity for Q&A or one on one. These installers will be there:

- ✧ Soveren Solar 6:30-6:45
- ✧ Integrated Solar at 6:50-7:05
- ✧ Solaflect 7:10-7:25

- A solarize Dummerston slide show and handouts describing the program.
- There will be a kiosk for people to sign up on the web site.
- We will have Snacks and drinks. So if you are at all interested in going solar and want to get the Solarize discount

... PLEASE JOIN US!



# Commuting for Work & Recreation

## Things you can Do During your Commute

Green Energy Times Staff

What do you do while you are commuting?

Some people spend their commuting time staring at the road, gripping a wheel, and getting stressed. Often they are either too sleepy, because they just got up, or too frazzled from the stress of the day to drive well. Most people, if they think about it, will find neither of these is really necessary, because they can greatly reduce their driving. So to answer the question, we came up with a list of things to do while you are on your way to or from work – while you leave the driving to someone else.

Do you want to get ahead in life? Try doing your homework. Are you a lawyer? Bring a file of material relating to a case. Are you a student? If so, you have lots of options of things you could be doing for homework. Are you a journalist? Bring notes and write a story. (Or better yet, work at home and avoid the commute altogether.) If you have any kind of job that requires that you do homework, do it on the commute and spend your home time with the family.

If homework requires a connection to the internet, that might still be okay. A lot of vehicles have Wi-Fi aboard. Trains very commonly have Wi-Fi aboard, and very often supply AC power for riders to plug their computers in.

Do you have a job with no home-work? That is okay. Enjoy the ride. Are you a ditch digger? Try reading *Pride and Prejudice* and *Prejudice*, you will find it a refreshing change of pace. Have you already read *Pride and Prejudice*? Read it again; it really does get better on each new reading. Of course, there so many novels and other pieces of great literature to read that it can be guaranteed that you will never run out.

Perhaps you want to keep up with the news. You could read a newspaper going to work, and Green Energy Times going home.

Some people really don't enjoy reading, of course, and they could bring along a portable DVD player. But then, dear reader, you are probably not one of those.

Another good choice might be to engage with people near by. Make friends. Talk about art history. Play games. In some places, groups of people spend the days' commutes playing bridge, or even poker.

Of course, you could just watch the countryside go by. Or you could sleep.

If you are among the thousands of people who believe they really need to drive a car, we might feel very sorry for you. But before we give up, we should remind you that there are other choices for nearly everybody. Car-pooling is one. Driving to a Park and Ride is another.

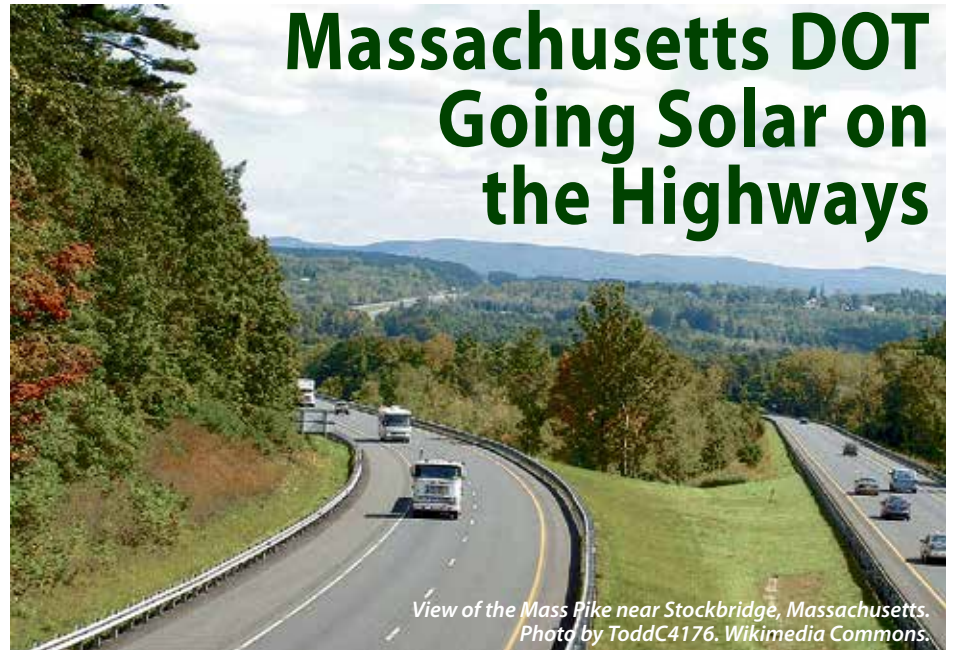
Of course you can walk or ride to public transit or ride-shares. You get health benefits along with the money you save.

In any case, you can find value in the time you use to commute, providing you do not drive yourself. When you do that, it means that you get value instead of doing a job for which you are not paid, driving a car.



Bicycle parking at the Alewife MBTA station, Cambridge, Massachusetts Photo by ArnoldReinhold

# Massachusetts DOT Going Solar on the Highways



View of the Mass Pike near Stockbridge, Massachusetts. Photo by ToddC4176. Wikimedia Commons.

By Thaddeus Rumple

The Massachusetts Department of Transportation (DOT) is getting into the business of running solar systems. It is putting in photovoltaic arrays at ten sites along state Route 3 and Interstate 90. More sites are still under consideration for three additional arrays.

A goal of installing the solar systems is to have at least six megawatts of new solar capacity. By doing this, the DOT says, it will be able to save taxpayers \$15 million over the next twenty years.

After a lengthy procurement process, the DOT decided to use Ameresco, Inc., a large clean energy company with an office in Framingham, Massachusetts. Ameresco will pay the DOT \$17.50 per kilowatt for its use of the land, and provide it with the electricity it produces. It will recoup its investment through the state energy credits, federal incentives, and the sale of electricity to the DOT, which it will deliver at a discounted rate.

The electricity at the ten sites under construction, combined with that from three sites being considered, is expected to total about 7.8 million kilowatt hours each year. That is enough to provide power for about 1,300 households and reduce carbon emissions by about 3500 tons.

With the steep decline in the price of solar power it is hardly a surprise that such road-side projects are being built. When we consider the transportation systems in the country, it is clear that solar systems built along highways can contribute an substantial amount of energy to supply the needs of the nation.

## RiDE. Don't DRIVE!



Left: High capacity bus leaves the Ruggles MBTA station in Boston, Massachusetts. Photo by Adam E. Moreira.



Right: High occupancy vehicle (HOV) lanes on an interstate highway. Photo by Mariordo.

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## A New Fast Charging Network for Vermont

Together, Green Mountain Power (GMP) and NRG are furthering Vermont's national leadership in sustainable energy. Vermont is the first New England state to be added to NRG EVgo's national public fast-charging network for electric vehicles (EVs), and GMP is the first utility in the country to partner with the EVgo network. The first of the network's charging stations, called "Freedom Stations," are conveniently located in downtown Rutland on Cottage Street.

This is the first comprehensive electric vehicle charging network in New England. GMP and EVgo plan to install 12 Freedom Stations statewide this year, increasing Vermont's energy independence and contributing to cleaner air and lower carbon emissions. Other locations will include Quechee, White River Junction and Waterbury.

"These new chargers represent the best in fast charging technology and we are so pleased to be offering them in Rutland, the Energy City of the Future," said Mary Powell, President and CEO of Green Mountain Power. "Our goal is to help Vermonters save money and reduce fossil fuel use through innovative products and services like these chargers, all while continuing to provide highly reliable, clean and cost-effective power."

"NRG EVgo is excited to partner with GMP to offer the first statewide DC fast-charging network in New England," said Denise Wilson, executive vice president

of NRG. "The NRG EVgo network is the only one in the nation that can charge all EVs on the road today. Vermont is a fantastic addition to the fastest-growing DC fast-charging network in the nation."

GMP plans to incorporate EVs in its eHome program. The program also helps families improve their homes with energy efficiency and such clean energy technology as heat pumps, heat pump water heaters, solar power, weatherization, smart plugs, and technology to control and track usage from anywhere.

Rutland Mayor Chris Louras said of the Freedom Stations, "Transportation is a critical component of a thriving community. As more and more Vermonters and visitors move to electric vehicles, it's vital that we have the infrastructure to support them."

The EVgo Freedom Station is capable of providing approximately 80% of a battery charge in 25 minutes when using the DC fast-charging option. The chargers also have level 2 capabilities that provide up to 24 miles of charge per hour. Customers can choose to pay as they go or sign up for various monthly charging subscriptions starting around \$5.95 a month.

For more information about electric vehicles and charging facilities across Vermont, visit GMP at: [bit.ly/GMP-about-EVgo](http://bit.ly/GMP-about-EVgo) or NRG EVgo at [nrgevgo.com](http://nrgevgo.com) or [driveelectricvt.com](http://driveelectricvt.com).

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# SMART COMMUTING IN NH & VT

Transportation emissions are among the worst offenders that add to the rising CO<sub>2</sub> levels in our atmosphere. In recent months we have learned that our efforts have begun to reduce the detrimental air quality counts (NHDES), but as you may have learned from numerous other reports such as the International Panel on Climate Change (IPCC), <http://climatechange2013.org/>, global warming is still advancing faster than expected.

How do we get our emissions down now? By making new commuting choices!

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

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

When carpooling, remember to use the local Park n Ride lots to meet your connections. Start your trip planning at [connectingcommuters.org](http://connectingcommuters.org) or [nh.gov/dot/programs/rideshare/](http://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](http://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](http://advancetransit.com)

**CARROLL COUNTY TRANSIT** - Services and connections to Belknap County. 888-997-2020 [tccap.org/nct.htm](http://tccap.org/nct.htm)

**CITY EXPRESS** - Serves Keene. 603-352-8494 [hcsservices.org/services/transportation/cityExpress.php](http://hcsservices.org/services/transportation/cityExpress.php)

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

**CONCORD AREA TRANSIT (CAT)** - Serves Concord 603-225-1989 [concordareatransit.org](http://concordareatransit.org)

**CONTOOCOOK VALLEY TRANSPORTATION (CVTC)** - Monadnock Rideshare for the southwest region 877-428-2882 [cvtc-nh.org](http://cvtc-nh.org)

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

**DARTMOUTH COACH** - Services to Boston, Logan Airport and NYC 800-637-0123 [dartmouthcoach.com](http://dartmouthcoach.com)

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

**NASHUA TRANSIT SYSTEM (NTS)** - Buses and trolleys with bike racks. 603-888-0100 [RideBigBlue.com](http://RideBigBlue.com)

**WINNIPESAUKEE TRANSIT SYSTEM (WTS)** - Services Belmont, Franklin, Tilton, Laconia. 603-528-2496 [bm-cap.org/wts.htm](http://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](http://vitalcommunities.org/transport/index.htm)

**VERMONT PUBLIC TRANSPORTATION PUBLIC TRANSIT** - Lists transit, ferries and more at [aot.state.vt.us/PublicTransit/providers.htm](http://aot.state.vt.us/PublicTransit/providers.htm)

**AMTRAK** - Long distance train service. Discounts for AAA members and student advantage card. (800) 872-7245 [amtrak.com](http://amtrak.com)

**CHITTENDEN COUNTY TRANSPORTATION AUTHORITY** - Burlington bus service with links to Montpelier, Middlebury and commuter route to Milton. [cctaride.org](http://cctaride.org)

**CONNECTICUT RIVER TRANSIT** - Services in Bellows Falls and Springfield. [crtransit.org](http://crtransit.org)

**GO VERMONT** - Offers carpool matching and commuter connections in VT 800-685-7433 [connectingcommuters.org](http://connectingcommuters.org)

**GREEN MOUNTAIN RAILROAD** - Day trips from White River, Champlain Valley, Bellows Falls and Rutland. [rails-vt.com](http://rails-vt.com)

**GREEN MOUNTAIN TRANSIT AGENCY** - Local service in Barre, Montpelier, Grand Isle, Stowe and Lamöille. 802-223-7287 [gmtaride.org](http://gmtaride.org)

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# GET BETTER FUEL EFFICIENCY THIS SUMMER

by Doug Moss & Roddy Scheer

Ah, the summer road trip, that classic American experience. But long drives through steamy weather can burn through a lot of gas and cause untold wear and tear on your car's engine and systems while putting you at risk for overheating. Doubling down on tactics to help your car run better will not only improve fuel efficiency, but could also help you avoid spending a large chunk of your vacation time in the breakdown lane waiting for a tow.

According to the American Automobile Association (AAA), there are lots of ways to conserve fuel on hot weather road trips that also will help prolong the life of your car. "In summer, drive during cooler parts of the day," reports the group. "Cooler, denser air can boost power and mileage."

While it may seem counterintuitive, using your car's air conditioning is actually a smart idea in hot weather. "Today's air conditioners create less drag on the engine than driving with the windows open," says AAA. Meanwhile, if you have a hybrid, pre-cool it before you get in so it can devote more electricity to driving when you are out on the road. But don't warm up (or pre-cool) a conventional car, as the extra idling doesn't do the car any good and just wastes fuel and creates extra heat. Another key tip for hot weather driving is to park in the shade when you can.

The Green Car Reports website suggests utilizing cruise control and overdrive features on cars that offer them on long summer roads trips; these features help even out the energy demands of the engine which in turn helps conserve fuel.

According to AA1car.com, a leading online information resource on auto repair and maintenance, placing a sunshade under the windshield and cracking the windows when parked can help keep the interior cool between drives. This can also "lighten the cooling load on the air conditioner when the vehicle



If you take good care of your car this summer, it will take better care of you on your big summer road trip. Credit: Kai Brinker, FlickrCC

is first started." The website also reports that changing old dirty motor oil with a fresh higher viscosity one will help keep your car's engine lubricated and running smoothly on those summer road trips. "For example, you might want to change from 5W-30 to 10W-30, 10W-40 or 20W-30 for hot weather driving," reports AA1car.com. "Synthetic motor oils are even better for high temperature protection."

Of course, some fuel saving tips apply any time of year. For instance, jackrabbit starts are a big no-no; drivers should always try to accelerate gradually. Taking your foot off the gas as early as possible when approaching a red light is another way to save gas. Keeping filters clean, maintaining recommended tire pressure and driving at the speed limit are additional ways to conserve fuel, reduce emissions and treat your ride nicely.

Of course, summertime road trips can also be hard on drivers and passengers, so pack plenty of sunscreen — especially if you plan to have the windows open (or top down)—and bring along a cooler with healthy drinks so everyone can stay hydrated.

Contacts: AAA, [www.aaa.com](http://www.aaa.com); Green Car Reports, [www.greencarreports.com](http://www.greencarreports.com); AA1car.com, [www.aa1car.com](http://www.aa1car.com).

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# RUSH HOUR IN COPENHAGEN





# WHOLESARE PROGRAM

Access to Healthy, Sustainable Products in New England

By Rob Fish

Northern New England families and small businesses which are dedicated to eating sustainably have a new option: Wholeshare. Wholeshare is an online marketplace that helps communities increase their geographic and economic access to healthful, sustainable food at wholesale prices through collective purchasing. Groups are encouraged to add additional local products from area farmers, bakeries, and food hubs to the vast catalog of available products.

Wholeshare groups perform as friendly neighborhood "pop-up grocery stores" where customers gain access to fresh local produce, meats, dairy, and grains from local farms, in addition to their favorite natural snack brands and sustainable household products. Not to be confused as merely an online farmer's market, Wholeshare offers a full spectrum shopping solution for the entire grocery store.

"I work 100% at my job and 120% as a mom and manager of my household," said Kim Brearly, the Director of Business Development at Designbook, "I was actively seeking healthy, affordable and time-saving solutions to eliminate at least one of the four grocery stores I now visit to stock up my household. I started a Wholeshare group in our office and not only have I found affordable, organic food and household objects that are delivered to my work, but I also found some great organic lollipops for my daughter's fifth birthday party!"

Wholeshare operates on the idea that all people should have access to local, organic products. The collective purchasing model enables customers to save more money and purchase foods that they might otherwise have trouble finding at their local grocery store. Customers are aware of where their food is coming from and whether the food is organic, fair trade, or certified kosher. Natural food stores and co-ops often form groups as way to expand their offerings and increase foot traffic into their stores. Community organizations use their Wholeshare commission as a way to fundraise while supporting their community-focused missions. Yoga studios and holistic



Merry Kay Shernock, a member of the Montpelier-based, Capital City Grange group, spreads the love with a heart-shaped eggplant she picked up at her Wholeshare pickup.

health practitioners use Wholeshare to provide another service to their health conscious clients. Farmers are even using Wholeshare to augment their CSAs and a provide a product year round to increase retention.

"Wholeshare's commitment to making local and organic food accessible is what attracted us to them," said Kelly McElheny, Founding Director of the Southshire Community Market. "We look forward to working with Wholeshare to fulfill the purchasing needs of our start-up food co-op."

To start a group in your community, sign up at <http://www.wholeshare.com/vtfoodbank>. For every new group that places an order between now and the end of July, Wholeshare will donate 150 meals to the Vermont Food Bank.

Rob Fish is the Director of Outreach for Wholeshare. He lives in Montpelier and can be reached at 802-540-5210 or [rob.fish@wholeshare.com](mailto:rob.fish@wholeshare.com).

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## WHOLESARE PARTNERSHIP WITH THE VT FOOD BANK

Wholeshare believes that everyone should have access to fresh, healthful food. As part of Wholeshare's dedication to sustainable, natural food they have partnered with the Vermont Foodbank to increase food access across the state. For every new group that places an order between now and the end of July, Wholeshare will donate 150 meals to the Vermont Foodbank. Half of these donations will go directly to the Vermont Foodbank in Barre and the remaining meals will be given to network partners in each of the new Wholeshare group's surrounding communities. The Vermont Foodbank nurtures partnerships like these in hopes that no one in Vermont will go hungry. With multiple locations around the state, the Foodbank is gathering and sharing food to a network of 225 food shelves, meal sites, shelters, senior centers, and after-school programs throughout Vermont.

"We are thrilled to be partnering with Wholeshare as they raise money to

provide meals for Vermonters in need of food help," said John Sayles, Vermont Foodbank CEO. "This year the Foodbank will provide enough food to feed 153,000 of our neighbors, work that we couldn't do without the generous support of businesses like Wholeshare."

To start a group in your community, sign up at <http://www.wholeshare.com/vtfoodbank>



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"The Wholeshare platform offers users local product recommendations as well as easy navigation to any product 'splits' that the group is ordering." Photo: Rob Fish.



# Community Solar Available To All Vermonters!

Green Mountain Community Solar (GMCS), a Groton, VT-based company, is now offering a new way to go solar -- from anywhere in the state! The solar panel ownership in the community group is from off-site solar farms and is now available to any Vermonter or Vermont business.

Previously, community solar farm participation was limited to subscribers in the same utility service territory as that of the solar farm. Now, any Vermonter, including all those who are served by any utility company such as GMP, Burlington, Ludlow, Stowe, Readsboro, Swanton, Orleans, Northfield, Morrisville, Lyndonville, Johnson, Jacksonville, Hyde Park, Enosburg Falls, Barton electrics, or Vermont and Washington Electric coops may participate in farms run by GMCS.

This is how it works: electric credits generated from any of GMCS's solar farms may now be monetized by any Vermont resident, business or nonprofit who buys panels in one of its group off-site solar farms. These panel owners are compensated either through a monthly credit on their GMP account or now through direct payment, which can be applied by the panel owner to his or her electric utility bill.

"Making off-site group solar farms available to any Vermonter makes the solar tent larger and more inclusive. With the value of solar electric credits now being able to be assigned to any Vermonter, so many more residents, renters, businesses and nonprofit organizations can share in the environmental and economic benefits of solar panel electric generation," says Bruce Genereaux, resident of Norwich and manager of GMCS.

With one community solar farm in operation in Groton and two more scheduled for construction this summer, in Chester and Groton Timberworks, GMCS will be able to serve more Vermont residents and businesses.



**Green Mountain Community Solar**  
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802 588 2063 [www.GMCommunitySolar.com](http://www.GMCommunitySolar.com)

A family from Bradford, VT, who signed up to go solar with GMCS commented, "After reviewing the economics of the Green Mountain Community Solar, it was a no-brainer for us. With the low-interest-rate 'Energy Improvement Home Equity Loan' from VSECU, the income from the solar panels is enough to fully offset our loan payments. Then once the loan is paid off, the income from the solar panels comes straight to us and fully offsets our home energy use. Everything is guaranteed for 30 years and it's maintained and managed by GMCS. Hopefully this deal with GMCS will encourage a lot of people to get off the fence and go solar." VSECU is the Vermont State Employees Credit Union.

To learn more contact Bruce Genereaux at 802-588-2063. [Solar@gmcommunitysolar.com](mailto:Solar@gmcommunitysolar.com) [www.gmcommunitysolar.com](http://www.gmcommunitysolar.com)



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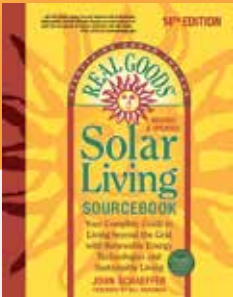
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# Cavendish Solar

Municipality Installs 148 kW Solar System Without Financial Assistance!

By Peter LaBelle, Cavendish Energy Committee



The Cavendish, VT 148kW PV array is truly hidden. Folks in town want to know where it is and how they can see it. Photo courtesy of Peter LaBelle.

On April 20, 2015, a 148 kW solar photovoltaic (PV) array was dedicated in Cavendish, Vermont. Many New England towns are jumping on the solar power bandwagon, but Cavendish is distinguished as a tiny town that did alone. Voters approved a bond and the town contracted for and installed the system without other financial assistance. What is different about this community solar array is that all benefits will accrue to Cavendish.

The project took several years from concept to power generation, but now provides enough electricity to offset what is used in the town office, the transfer station, the water filtration plant and the waste water treatment plant.

The Cavendish Energy Committee started by considering installers who would provide outside financing. The savings from this turned out to be too small, so the plan fell through.

Then the committee started studying the finances. They found that at current bond rates the town could finance the entire project and when incentives were included in the calculation, the savings would be significantly greater than the financing cost.

In Vermont towns, any municipal bond must be approved by vote in the Town Meeting. Since Vermont voters are notoriously careful about approving bonds, the committee conducted town-wide informational meetings.

Finally, at town meeting, the committee made a full presentation. They covered all aspects of the project with PowerPoint slides and

handouts. The presenters concentrated on the dollar savings that could be expected over time. While financing costs are being paid, the savings are substantial, and once the financing is paid off, power will be virtually free.

Cavendish had an unused slope alongside the waste-water treatment plant. It could not be seen from the road or any houses, so there was little objection to using it for a solar array. The final Town Meeting vote was overwhelmingly in favor of the bond. The following day, the town issued a request for proposals. Ultimately, the Select Board chose Prudent Living of Windsor, Vermont to build the array.

Construction began almost immediately and progressed quickly because some incentives would be lost if the project were not completed by December 31st. Land clearing was completed in September, fencing began, and materials were delivered in October. Construction started in November. Prudent Living worked through cold and snow to complete the project over a week early.

As of the first week in May, 2015, the municipal solar PV system had made more than 50,000 kWh of electricity. Peter LaBelle, a member of the Cavendish Energy Committee, commented, "The cost savings have not been determined yet, since the power allocations among the net-metered accounts are still being tweaked. But you can get an idea based on GMP rates and the kWh produced."

Cavendish will continue working on energy. The town has joined with Weathersfield, Reading, Windsor and West Windsor to participate in Solarize Upper Valley. There is a long way to go for full energy independence, but Cavendish is on the way.

Up-to-date information on how the Cavendish solar array is performing is available at bit.ly/Cavendish-solar-array.

The municipal solar system provided a positive cash flow from the moment the electricity was put into the grid!

# Norwich, Vt Community Power

By George Harvey

News has come that the town of Norwich, Vermont has achieved a remarkable goal. All of its municipal buildings are powered 100% from local solar power. The town will immediately benefit by a reduction in costs of electricity of about \$2000 per year, and once the cost of the system is paid down, its electricity will be practically free, saving \$20,000 per year.

The solar system was installed by Solaflect, a local manufacturer of an inventive solar tracking system that reduces system costs. While it is certain Norwich is the first community in Vermont to have 100% of its municipal power from solar power, Bill Bender, CEO of Solarflect, believes it may in fact be the first in New England.

Bender wants to be very clear on what it means to be renewably powered. We live in an era when credit for being renewable can be bought and sold in the form of renewable energy credits (RECs). Many organizations, especially utilities, face legal requirements that some percentage of their power come from renewable sources. If they cannot produce enough renewable energy themselves, they buy RECs from those who can. This encourages others who might otherwise not do so to produce renewable energy and sell RECs. Bender's point is that if you have solar power and you sell the RECs, you are selling the right to take credit for the renewable nature of the power you produce.

Norwich, in creating the power it uses from renewable sources, is creating RECs. Because the town wants to take credit for the power it creates, it retires the RECs it creates, rather than selling them. So, the town buildings of Norwich really are 100%

powered by renewable sources. The decision to retire the RECs was considered by the Energy Committee and approved by the town government.

Linda Gray, who is on the Norwich Energy Committee, says the committee has spent years pushing solar systems. The first thing they did to get the municipal buildings powered by solar was to look into having some organization both finance and install solar photovoltaics. This proved unsuccessful, because it did not produce a good enough deal for the town.

The committee wanted not only to reduce the carbon footprint of the town, but to reduce its costs. While a solar system that had its RECs retired was part of the process, a way had to be found to do it economically.

By doing its own financing and working with Solaflect, the committee was able to accomplish what it had set out to do for the town's buildings. The committee has pushed the community into Solarize campaigns for some time. The elementary school and the town library, neither of which is a municipally owned building, have both moved toward renewable solar power. The committee has also enabled local organizations and businesses to have and use solar power. One organization that has worked on this is Dan and Whit's general store, whose array of twenty panels was installed by Renew Solar.

The municipal system in Norwich is not the first accomplishment of the town's Energy Committee, nor will it be the last. We offer congratulations and look forward to the next development.



Solaflect dual axis suspension PV trackers were used to make clean, renewable energy for the town buildings in Norwich, Vermont. Photo courtesy of Solaflect.

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# SOLAR UP NEW HAMPSHIRE IS HAPPENING!

By Jack Munn

Solar Up NH is rolling and the sun is shining. Community and public interest in participating in the first solarize pilot project in the southern New Hampshire region is gaining momentum and things are happening. Since rolling out this new project, a total of seven communities have been selected to participate among the region's fifteen municipalities. A request for information was released and six of the seven communities selected decided to work together to form a coalition in carrying out the two solarize campaigns. Each town selected a solar installer to work with among many businesses that were considered. The communities, solarize rounds, and installers are as follows:

**Round One (June through Sept., 2015)**

The towns of Bedford and Goffstown will work together as a coalition working with NuWatt

The Town of Franconstown will work with Milhouse Enterprises

**Round Two (Sept. through Dec., 2015)**

The towns of Derry and Chester will work together as a coalition working with Revision Energy

The towns of Candia and Deerfield will work together as a coalition working with Granite State Solar.

Since selecting these communities, the telephones and emails have been non-stop from residents asking for information and how they can sign up. The core local volunteer committees and leads have been established in each of the seven communities to organize and implement the solarize campaigns and public outreach events. If you have not heard of solarize and Solar Up NH, don't worry -- you will as this program is spreading fast.

The basic idea is to lower the cost of solar through group purchasing -- the more people that sign up to go solar -- the costs are lowered for everyone. Solar Up NH goals are to drive solar installation costs down 10 to 15% below market price and double the number of solar users in each community. This will be accomplished through local solarize market-

ing campaigns and media events promoting solar, to be carried out by the core local volunteer committees in each community. These local core groups will be helped by staff from the Southern NH Planning Commission, Smart Power (a national marketing company), the NH Sustainable Energy Association, and the Hillsborough County Area Renewable Energy Initiative (HAREI).


Most solarize programs are designed specifically for residential homeowners. However Solar Up NH is designed to also benefit small businesses, non-profit organizations, churches and farm enterprises, including municipalities. The solar installation model promoted is direct ownership, but other forms of solar ownership, including leasing and power purchase agreements will also be considered. In addition, Solar Up NH will promote the use of solar loans and other owner special financing.



Communities participating in the Solar Up program are highlighted. Photo credit: Southern New Hampshire Planning Commission

More information about Solar Up NH can be found at <http://solarupnh.com> or by contacting Jack Munn, Southern New Hampshire Planning Commission at [jmunn@snhpc.org](mailto:jmunn@snhpc.org) or 603-669-4664.

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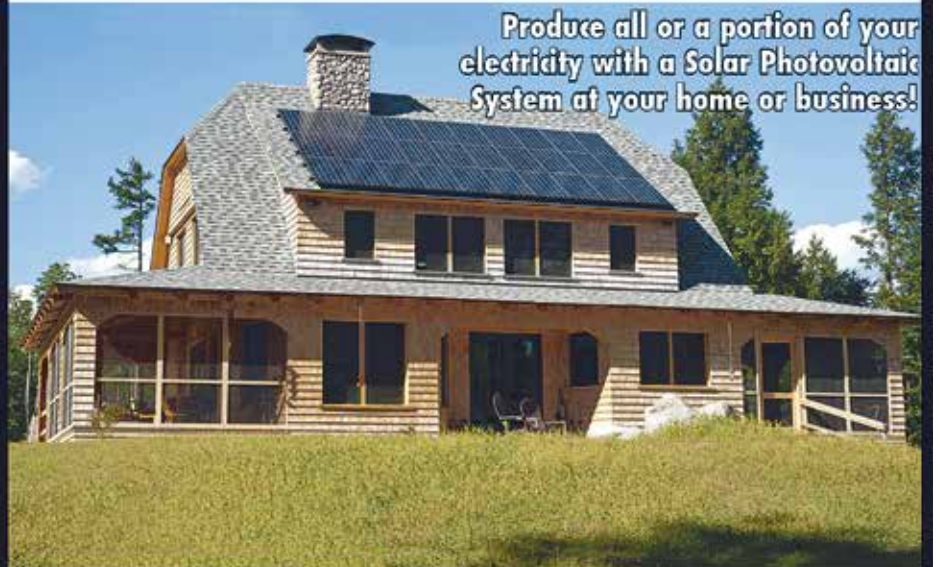


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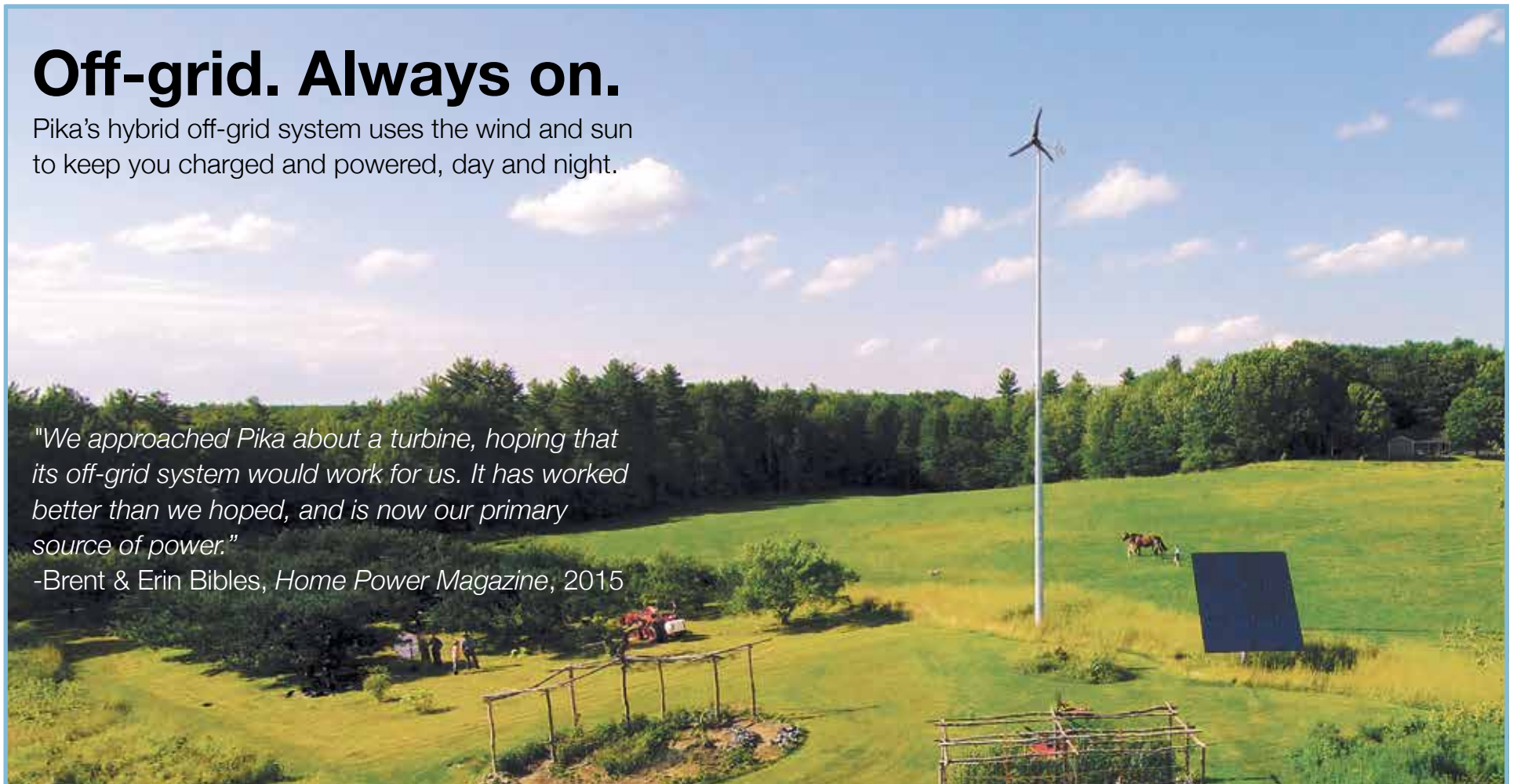
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-Brent & Erin Bibles, *Home Power Magazine*, 2015



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# BRATTLEBORO'S 'SOLAR SUMMER'!

By George Harvey



Brattleboro, Vermont. Photo by Ken Gallager. Placed into the public domain by the author.

As usual, Brattleboro, Vermont, is doing things a little differently. Brattleboro Solar Summer is in most ways similar to the Solarize programs seen elsewhere, but with a twist. In most Solarize programs, there is a single installer. In some there is a different installer for each type of installation. Putney, for example, had different installers for home-based photovoltaic systems, a community solar garden, and solar thermal water systems. In Brattleboro, there are five installers, giving the residents of the community choices.

The program is the product of the town's Climate Protection Committee and the Energy Committee. It was launched on May 1, and will continue until Sept. 30.

The goal of the program is to get a hundred new installations in Brattleboro.

All five installers will do home and business systems, including installations at multi-unit buildings. This is true whether the system is ground-mounted or roof-mounted. In addition, three of the installers will do community solar systems for people without good solar sites of their own.

When a lot of people have solar systems installed at the same time, there is an advantage in the combination of purchasing power. So there will be discounts for the customers depending on how many people participate. The discounts will range from \$50 to \$200 per kilowatt.

The program has financing available through the Vermont State Employees Credit Union. There is also financing through the Windham County Solar Loan Program, and this has special rates that will only last until the money in the program runs out. Depending on circumstances, the rates will range from 0% to 5%. The financing is calculated so Brattleboro Solar Summer participants should be able to see reduced costs from the start.

The 30% federal tax credit for the cost of solar installations is available for the program. Anyone who is thinking of putting a switch to solar power off should consider that the credits end in 2016.

Paul Cameron, Brattleboro's Energy Coordinator, said, "There has never been a better time to go solar because the price of solar has dropped 50% in the past two to three years."

In addition, he pointed out that this program makes purchase now especially attractive, and quite possibly better than waiting for the price to drop further.

Two of the installers in the program will do home and business systems only:

- **Gary MacArthur Solar** Marlboro, Vermont 802-257-7026
- **Solar Source** Keene, New Hampshire 603-352-4232

The other three will do home and business systems, but also have community solar available. They are:

- **Integrated Solar:** Brattleboro, Vermont 802-257-7493
- **Soveren Solar:** Putney, Vermont 802-869-2500
- **Sunnyside Solar Store:** Brattleboro, Vermont 802-376-3838

**The first step for those interested in participating is to arrange for a site evaluation, which is free.**

The web site for Brattleboro Solar Summer is [www.brattleborosolarsummer.org](http://www.brattleborosolarsummer.org).

Contact Paul Cameron at 802-251-8135.

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# Off-Grid in the City

By Maggie Williams

As electrical utilities across the country continue to increase rates and cut back on solar incentive programs, more people than ever are taking their homes off the grid -- gaining in energy independence, financial stability, and alleviating the headache of dealing with the local electric company.

Advances in solar and battery storage make going off-grid more viable than ever before, and there are several off-grid options depending on the desired level of grid independence.

The first option is to take a home completely off the grid. To disconnect from the utility, a large solar array and battery are needed to power the home, plus a generator is recommended for backup. Going off the grid may require some power consumption sacrifices, so using energy-efficient appliances is important.

For the homeowner who is interested in reducing his or her dependence on the grid using a solar and battery system, but does not want to completely disconnect from it, the second option is called "grid backup" or "grid zero."

Grid backup is designed to optimize the use of renewable electricity and battery storage. If additional electricity is needed, the inverter (which converts direct current from batteries to alternating current similar to what the grid provides) automatically engages the grid to help support the loads. This type



Cadillac, Mi - wind and solar compatible battery. Photo courtesy of Iron Edison.



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of setup gives the homeowner flexibility on the size of array and battery, since all electrical loads do not need to be covered by their home PV system.

Grid backup is also a good option for the homeowner who is looking for a solar and battery system to keep the lights on when the grid goes down. In an emergency where the grid could go down for a

long period of time, it can be hard to find fuel for a generator. A solar-and- battery-backup system can run a homeowner's critical loads without him or her ever having to leave in search of fuel.

Batteries are essential to going off the grid, as they store the surplus energy a solar array creates during the day for use at night. The most common battery that

*cont'd on p. 35*

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# VT's Statewide Solar Tours

Solar projects in communities throughout Vermont will be open for public tours the third Saturday in June.

"Celebrate Solar Tours" will take place across the state on Saturday, June 20, the weekend of the summer solstice.

Like open sugarhouse weekend in the spring and open art studio weekend in the fall, the summertime tours will give Vermonters the opportunity to get an up-close view of solar systems to learn about

the technology, solar economics, and the benefits of solar to our community.

Solar customers, host farmers, and owners alike will be on-hand to speak with the public – with many of the sites offering fun events, also.

Among the solar sites open to tour June 20: iconic and sweet Vermont attractions like Cold Hollow Cider and Morse Farm Maple Sugarworks, high-tech attractions

like Draker Solar Labs and Small Dog Electronics, agricultural farms like Champlain Orchards, multi-customer shared community solar arrays, and some of Vermont's highest producing solar farms.

"Folks know us and visit us for our cider and donuts. But we are thrilled to open up the field behind our cidery to share the benefits of solar technology to our business and our community. We'll of course also be serving up some sweet treats for those who come by," said Paul Brown, owner of Cold Hollow Cider in Waterbury

Center, which has a 150kW system powering its operations.

More than 40 systems are anticipated to participate in the day and a growing statewide map can be found here . Many featured sites will host refreshments, music, or other entertainment. Other planned solar events include community walking tours of residential solar installations, miniature golf and on-site yoga.

"One of the immeasurable values of living in Vermont is the strength of our communities. We now have *cont'd on p. 34*

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### USDA RURAL DEVELOPMENT PROGRAM

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

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

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

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### VT TAX CREDITS

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

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- Refrigerators - \$40 rebate for CEE Tier 2 Refrigerators, \$75 for CEE Tier 3 & ENERGY STAR Most Efficient
- Working second refrigerators or freezers are potentially eligible to be picked up. \$50 incentive to retire old units.
- Clothes Dryers - \$50 to \$400 rebate on select ENERGY STAR models

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- Pool Pump – up to \$400 rebate on qualifying ENERGY STAR models
- Meter Loan – borrow "Watts Up" meter to measure the electric consumption of your appliances

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## NEW HAMPSHIRE

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

#### Category 2:

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

Contact [Elizabeth.Nixon@puc.nh.gov](mailto:Elizabeth.Nixon@puc.nh.gov)

#### Commercial Bulk Fuel-Fed Wood Pellet Central Heating Systems

- 30% of the heating appliance(s) and installation cost, up to a maximum of

\$50,000. An additional 30% up to a maximum \$5,000 is available for thermal storage. Systems must be 2.5 million BTU or less

### Residential Solar PV Rebate Program

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

Contact [jon.osgood@puc.nh.gov](mailto:jon.osgood@puc.nh.gov)

### Residential Solar Water Heating Rebate Program

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

Contact [barbara.bernstein@puc.nh.gov](mailto:barbara.bernstein@puc.nh.gov)

### Wood Pellet Boiler or Furnace

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

Contact [barbara.bernstein@puc.nh.gov](mailto:barbara.bernstein@puc.nh.gov)  
[www.puc.nh.gov](http://www.puc.nh.gov) – Sustainable Energy or tel. 603-271-2431 for more information and current program status

### LOCAL INCENTIVES

Some towns provide property tax exemptions for renewables – visit [www.bit.ly/NHtownRenewablesTaxBreaks](http://www.bit.ly/NHtownRenewablesTaxBreaks)

- These are offered on a town-by-town basis.
- The state also has passed PACE (property-assessed clean energy) enabling legislation which will allow towns to use the PACE mechanism to finance clean energy projects through property taxes. Visit <http://www.nh.gov/oep/programs/energy/pace/index.htm> for more information.

### RENEWABLE ENERGY INCENTIVES OFFERED THROUGH THE NH ELECTRIC CO-OP

**PLEASE Check for UPDATES With NHEC.**

#### Commercial Solar Thermal (Hot Water)

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

#### Commercial Solar PV

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

#### Commercial Fossil Fuel Program

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

#### Residential Solar PV

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

#### Residential Solar Hot Water

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

#### Heat Pump Water Heaters

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



**Heat Pump Conversion**

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

**PAREI**

To explore the possibility of a solar installation. Plymouth Area Renewable Energy Initiative. [www.plymouthenergy.org](http://www.plymouthenergy.org)

[WWW.NHSAVES.COM](http://WWW.NHSAVES.COM)

[WWW.NHEC.COM](http://WWW.NHEC.COM)

**NH HOME PERFORMANCE WITH ENERGY STAR**

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

Visit [www.nhsaves.com/residential/ret-rofit.html](http://www.nhsaves.com/residential/ret-rofit.html) for more information and an online Home Heating Index calculator

**NH ENERGY STAR HOMES**

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

Visit [www.nhsaves.com/residential/homes.html](http://www.nhsaves.com/residential/homes.html) for more details.

**NH ENERGY STAR APPLIANCES & LIGHTING**

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

Visit [www.nhsaves.com/residential/es\\_appliance.html](http://www.nhsaves.com/residential/es_appliance.html) for more information and rebate forms.

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

Visit [www.nhsaves.com/residential/es\\_lighting.html](http://www.nhsaves.com/residential/es_lighting.html) for more information.

**NHSAVES LIGHTING AND EFFICIENCY CATALOG**

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

Offered at discounted pricing for NH electric utility customers, and fulfilled by EFI. Visit [catalog.nhsaves.com/](http://catalog.nhsaves.com/) for an online version of the catalog.

**2014 ENERGY STAR® RESIDENTIAL HEATING,**

**COOLING, & WATER HEATING EQUIPMENT REBATE**

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

Program details and application at [www.NHSaves.com/heatingcooling](http://www.NHSaves.com/heatingcooling)

**OTHER NH ELECTRIC UTILITY PROGRAMS**

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

Visit [www.nhsaves.com/resource/](http://www.nhsaves.com/resource/) for individual utility contact information.

**Business Programs**

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

Visit [www.nhsaves.com/](http://www.nhsaves.com/) for information about NH business incentives for electricity efficiency.

**NH Weatherization Assistance Income-Eligible Programs**

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

Visit [www.nh.gov/oep/programs/weatherization/index.htm](http://www.nh.gov/oep/programs/weatherization/index.htm) for application criteria, FAQs and local program contacts

**MASSACHUSETTS**

**COMMONWEALTH SOLAR HOT WATER (SHW) PROGRAMS**

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

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

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

**MASSSAVE HEAT LOAN SHW**

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

**ENERGY EFFICIENCY**

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

7-day digital programmable thermostats, Energy Star replacement windows

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

Visit [www.masssave.com/residential/heating-and-cooling/offers/heat-loan-program](http://www.masssave.com/residential/heating-and-cooling/offers/heat-loan-program) Please call 866-527-7283 to schedule a free home energy assessment.

**MASSACHUSETTS SOLAR LOAN PROGRAM**

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

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

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

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

**DEPT OF ENERGY RESOURCES**

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

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

No sales tax on residential solar hw or pv systems.

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

**NEW MA SREC POLICY**

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

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](http://bit.ly/Mass_SREC_II)

*Do You Understand...*

*Cont'd from p. 1*



home battery, will come at a cost of \$250/kWh. This means that battery storage is cheap enough that the combined cost of solar power and a battery is lower than the cost of the least expensive fossil fuel choices in many places.

This changes everything. In fact, it is what is called "disruptive."

The cost of the batteries is so low that the prices of electricity produced by wind turbines and stored in them is lower than the cost from natural gas plants. The cost of electricity from batteries charged with solar is competitively priced, but solar power has the huge advantage of having an absolutely predictable cost of fuel. Electricity generated by coal and nuclear plants is simply no longer competitive at all. There really may be no reason to build another fossil fuel or nuclear-powered plant.

Elon Musk pointed out that the amount of space needed to power the country with solar panels was actually very small. On a huge map of the United States, the area was just a small square in the middle of Kansas. He also pointed out that this need not be land with any agricultural value; it could largely be on the rooftops of buildings, or roofs and canopies over parking lots or other urban areas. Only shortly before the Tesla battery press conference, in fact, the journal, Nature Climate Change had published a study concluding that nearly 100% of the electrical needs of California could be from such urban sources.

This is a turning point.

The economic factors are compelling. We will almost certainly be shifting rapidly to renewable power backed up by batteries. Interestingly, Musk's position on competition is that he wants to see other companies offer similar products. In fact, he is so interested in doing this that he is giving away the technology of the lithium-ion batteries he is selling, much as he has done with the technology of the cars sold by Tesla.

For years, we have heard the same old complaint about renewable energy, "The sun doesn't always shine, and the wind doesn't always blow." It was once a pretty effective way of putting a damper on the enthusiasm of people interested in renewable energy. It was never a valid point, but troublesome to deal with, because answering it involved a complicated explanation that went over the heads of people who were mentally or financially stuck in a century-old paradigm. But now, there is an answer in a single, short response that anyone should be able to understand, "Tesla batteries!"

Elon Musk's announcement of the Tesla battery can be seen at [bit.ly/tesla-battery-announcement](http://bit.ly/tesla-battery-announcement).



# Solarizing NY's Capital Region

JUNE UPDATE by Stephen Andersen



A residential solar installation in Queensbury, NY in the winter of 2014. Photo courtesy of Ben Sopczyk from 'Active Solar.'

Community Solar, also known as "solarize," is ramping up for the summer! Your fellow citizens are working together to drive down the cost of solar electric installations, as well as to reduce the complexity of the purchase decision.

For the last several months, citizens have been working together to prepare for this summer. They have sent out requests for proposals to area solar installers, and have selected installers to work with. Costs for solar installations are coming down. In addition, the volunteers are helping people to understand solar energy. Public presentations are being scheduled, where questions about solar energy will be answered. Also at these presentations, the specifics of how to request a solar proposal for your home will be shared.

Solarize campaigns also encourage neighbors to get to know one another. As homeowners install solar power, neighbors are inspired by their example. People talk together and learn from each other. Neighborhoods are strengthened.

Whether you want solar on your home, or want to support one of these campaigns with your volunteer hours, check them out!

**Albany County.** Now that the **Solarize Albany** installer has been selected, Apex Solar ([apexsolarpower.com/](http://apexsolarpower.com/)), the Solarize Team is focused on getting the word out about the program across Albany County. Volunteers are holding public presentations in an effort to reach as many people as they can. If you or your organization would like to schedule a presentation from Solarize Albany, please let them know. If you want to help Solarize Albany spread the word about solar in Albany County, contact Dave or come to the weekly Solarize meeting (Thursday, 6 to 8pm) at the Honest Weight Food Co-op, 100 Watervliet Avenue in Albany. Contact: Dave Hochfelder: 848-391-9103. [solarizealbany@gmail.com](mailto:solarizealbany@gmail.com). [SolarizeAlbany.org](http://SolarizeAlbany.org).

**Rensselaer County.** **Solarize Troy** has selected Monolith Solar of Rensselaer NY ([monolithsolar.com/](http://monolithsolar.com/)) as its designated solar installer for the 2015 season, which will end September 15, and in a separate program for low and moderate income homeowners within the City of Troy, Grid Alternatives of California was selected as the vendor. Solarize Troy covers all of Rensselaer County. Pricing has been established, which will provide up to 20% discount, if our target volume is reached. All US-made equipment will be used. Twelve solar workshops and house parties have been held so far and

will continue throughout summer. Join us! More at: [xtroy.org/solarize](http://xtroy.org/solarize).

Contact Jean Howard 518 833-0744. [solarize@xtroy.org](mailto:solarize@xtroy.org). [solarizetroy.org](http://solarizetroy.org)

**Saratoga Springs.** **Solarize Saratoga** is working to finalize installer selection by June 5, to offer customers both purchasing and leasing options. The Solarize Team is having regular weekly meetings and actively enlisting volunteers focused on getting the word out about the program in the City of Saratoga Springs and adjacent communities. Please visit our table on Saturday morning at the farmer's market at High Rock Park to learn more and sign up for a free site assessment. A launch party of Solarize Saratoga will take place later in June and we are currently scheduling presentations with community organizations, builders, realtors, and appraisers in an effort to reach as many people as we can. If you or your organization would like to schedule a presentation from Solarize Saratoga, please let us know. If you want to help Solarize Albany spread the word about solar in Saratoga Springs, contact Rayna for more information on the weekly Solarize meeting (Wednesday 6 to 8pm). Contact: Rayna Caldwell: 518.424.9304. [solarizesaratoga.org/](http://solarizesaratoga.org/). [info@solarizesaratoga.org](mailto:info@solarizesaratoga.org)

**Schoharie County.** **Solar Works Schoharie** is continuing the successful program that they started in previous years. Selected installer: Revolution Solar ([revolutionso-larny.com/](http://revolutionso-larny.com/)) Contact: Sandy MacKay: 518 234-2817. [solarworks@midtel.net](mailto:solarworks@midtel.net). [solarworksschoharie.org/](http://solarworksschoharie.org/). Also, there are two other campaigns that are just starting up. If you are want to support solar in these areas, please reach out to the contact person!

**The Southern Saratoga County Campaign** is forming their team and there is room for more enthusiastic people to help. It includes Clifton Park, Mechanicville, Stillwater and Halfmoon. Installer: non selected yet. website: na. Contact: Joanne Coons: 518- 522-3173. [coonjoan@gmail.com](mailto:coonjoan@gmail.com)

**Schenectady County.** **Solarize Schenectady** is in its formative stage, with new members welcome to expedite its progress. Installer: non selected yet. website: na. Contact: Gary Lessard; 518.346.2290. [lessardgary@gmail.com](mailto:lessardgary@gmail.com).

*Stephen Anderson volunteers his time to plant seeds of Solarize projects in the Capital Region, and plays a significant role in inspiring each project. His background in solar includes having graduated from the Hudson Valley Community College Solar PV program, and is NABCEP certified.*

## SOLAR THERMAL IN NY

By Wyldon King Fishman

New York started out with \$3.6 million in the Regional Greenhouse Gas Initiative (RGGI) fund. Upstate farms benefitted from the lion's share of the RGGI millions. Residential solar thermal hot water cuts energy usage, is easy to hook up and costs less than solar electric or photovoltaics (PV). Pool owners jumped on the bandwagon early on and pool heating with the sun takes the worry out of extending the season for swimming. Free hot water makes sense.

Apartments, hotels, senior living centers, dormitories, Laundromats and sports clubs use more hot water than many businesses. Solar hot water system incentives went up and down and then they came and went. The equipment installed years ago works and keeps proving the technology works well. Way before PV electric systems, solar hot water was the only game in town. It was cheap and easy.

Solar hot water ("SHW") isn't the darling of Wall Street. There are no phone rooms and salespeople quoting Google Earth statistics for your home. But there is storage and, technically, it is a battery. The super-insulated tank full of very hot water can hold the temperature over night. It stores solar energy. It gives the energy back to you when you're getting ready for the day. Click on the dishwasher or put a load in the clothes washer and your own personal heat storage sends hot water right where you need it.




Chardes House High Meadow Farm with a solar thermal (hot water) system on the roof, in Warwick, New York. Photo courtesy of NYSES.

Here's a rule of thumb. An average domestic hot water system will wind up costing the consumer \$2-3,000.00 after tax credits and rebates. The federal investment tax credit is due to expire at the end of 2016. Take advantage of the opportunity before it disappears. NY offers the 25% tax credit, too.

Space: a family needs one fifth of the roof space compared to what PV electric would take. If you have been told you do not have enough sun for solar electric, you may be able to get solar thermal and the good news is that it's a lot less expensive than PV electric.

Two hundred days each year there is plenty of sun to collect. If you want to make hot water, make it with the sun. Do the math. Money on the roof is better than money in the bank. NY needs an easy, consistent financing method for green energy projects.

*Wyldon King Fishman is the founder and president of the New York Solar Energy Society (NYSES).*



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# Net-zero Apartments ... in Rotterdam, NY

By Emma Rumple



All of the energy used at netZero Village comes from the sun. Photo courtesy of David Bruns

A new and different kind of apartment building has been constructed in Rotterdam, New York. It has the amenities people would expect in up-scale homes. It has four basic apartment designs, with one or two bedrooms. It is built to be comfortable.

One thing that makes netZero Village different, just as the name implies, is that it uses net-zero energy. The apartment complex generates as much energy as its occupants can reasonably use. That includes heat, air conditioning, and even the energy for charging electric cars. Year by year, the complex should produce what it needs, with no more dependence on outside resources than it takes to get through short-term energy fluctuations. It is advertised as New York State's first net-zero apartment community.

There is more setting it apart. It has a different business plan, built on the idea of loyalty. The plan is that tenants should be able to expect loyalty from the management. To accomplish this, management will not merely show its face from time to time. It must be seriously involved. The manager is expected to be willing to drive the snow plow, should that be necessary. Owners and managers will have to be available to

people who live on the property.

netZero Village is the brain-child of David Bruns, the General Manager and owner of Bruns Reality, LLC. After spending some years as an electrical engineer for General Electric, Bruns decided to go his own way and went into his present business.

All of the energy used at netZero Village comes from the Sun. There are solar photovoltaics providing electricity. There are solar thermal collectors producing hot water. The buildings have both passive solar heat and very efficient heat pumps. All of the appliances, whether for kitchen or laundry, are of highest efficiency. Shower heads and toilets are of water-saving designs. Lighting is LEDs.

A comfortable home is comfortably, and carefully, insulated. The buildings for netZero Village were designed with insulation and superior windows in mind. Air leakage tests are conducted several times in each building as it is built.

Careful air-sealing requires careful ventilation. Heat recovery ventilation makes it possible to have a constant stream of pre-warmed, very clean, fresh air coming into each unit with minimal heat loss. The old days, when the air was fresh because

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"MIT Technology Review" (vol 115, No 6, p.43)  
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the wind blew around the window frames, are a thing of the past.

The tenants should expect that no comfort is given up when they live at netZero Village. They should be as warm or cool as they would reasonably like to be. They should not have to think about the energy they consume, beyond taking occasional delight that it is safe and free of the carbon impacts of old technologies.

The netZero Village's website is netzero-village.com. See their ad on p. 39.

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# GREENFIELD IS GREEN

## Community Aggregation



Court Square, Greenfield, MA.

Photo: Wikimedia Commons

Massachusetts started a ball rolling when it passed the nation's first Community Choice Aggregation Bill in 1997. This gave market groups and communities the ability to combine purchasing to get better rates for their residents. Under the system, a community can get all its power from whatever power sellers it wants, at whatever rates it negotiates. Individual consumers have a right to opt out of the system, under Massachusetts Law.

With early successes for the program on Cape Cod and Martha's Vineyard, other communities followed suit. Greenfield Mayor William Martin was especially interested, and he started working with Carole Collins, Greenfield's Director of Energy and Sustainability, on the idea. She liked the idea, but wanted to go a step further. She told Martin she would be happy to work through setting up the program, but wanted to be sure the power purchased was as renewably

produced as possible, up to 100%.

With some research and a bit of work, Collins was able to find enough renewable power providers who would sign contracts with Greenfield's Community Choice Aggregation. Because they were able to sign on as a community, with combined buying power, they were able to get deals that reduced the costs to everyone. It is not a huge reduction, but it is a dollar or two less than people would otherwise pay. Thus, both Mayor Martin's economic goals and the sustainability goals of Carole Collins were met.

Power providers are local, where that is possible. Solar systems in Greenfield and nearby wind turbines are among the sources. Getting renewable power required signing up with some producers at greater distances, however, including wind farms in Maine.

Collins does not claim that Greenfield's electricity is 100% from renewable sources. She says there are non-renewable power sources that are required by state regulations to be included in the mix. Nevertheless, they are really minimal, and the city is practically 100% renewably powered. And it is so with a reduced cost.

Collins says there is still a lot of work to do. She does not like the idea of buying power from elsewhere, if it can be produced locally. She looks forward to seeing more solar power being produced and becoming part of Greenfield's energy mix. She would also like to see progress on putting together one or more microgrids in the community for resilience in the future.

Greenfield has made a lot of progress. Given the history of the city and the dedication of the people living and working there, it is really not a surprise.



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## CO-OP POWER

By George Harvey

Co-op Power is a grassroots member-owned co-operative focused on sustainable energy. By combining purchasing power of its members, it provides efficiencies of scale to make renewable power and products available inexpensively. It has a commitment to having a responsible presence in the community, based on economic and racial equality and a concern for the well-being of all, members and non-members alike.

The co-op is organized into regional Community Energy Co-ops. Most of these are in Massachusetts, in the Greater Boston area, Franklin County, and Hampshire County, Hampden County. One covers the area of the Blackstone River from Worcester, Massachusetts, down to Providence, Rhode Island. One covers southern Vermont. While most members are within these areas, membership is not exclusive to them, and there are some who live in New Hampshire, New York, and elsewhere.

Co-op Power provides discounts on a wide variety of products and services. The services include home efficiency assessments, and help with insulating and sealing. Products include discounted fuels, such as bio-diesel, heating oil, and propane; purchase and installation of a number of kinds of equipment, including heat pump water heaters, window treatments, and more. Co-op Power can help with installation of solar systems for homes and businesses.

There is a member-to-member program providing mutual help. The co-op also works with other co-ops and organizations. For example, Co-op Power installed the solar panels that are on the roof of the Brattleboro Food Co-op. Now, they are starting up a subsidiary, Northeast Biodiesel, which will provide renewable diesel fuel for members and, eventually, others as well.

Membership in Co-op Power is \$950. The payments for membership can be made over time and there are discounts for people who qualify for them.

Co-op Power's website is [cooppower.coop](http://cooppower.coop).

## NORTHEAST BIODIESEL WILL SOON BE OPERATIONAL

By George Harvey

At long last, Co-op Power has raised the money needed to open the Northeast Biodiesel plant in Greenfield, Massachusetts.

They started working on the idea over ten years ago, and have worked hard through many changes of fortune to bring operations to the final stretch. A final fund-raising push, which ended on June 1, raised the last \$800,000 needed to complete the \$4.2 million project. Most of this came in the form of loans from Co-op Power's own members.

The new plant will have an initial production of 1.75 million gallons of biodiesel fuel per year. This will increase to 3.76 million in the foreseeable future. The oil will be converted from waste vegetable oil.

In the past, waste vegetable oil was often sent to a landfill, where it decomposed, putting carbon dioxide into the atmosphere, along with some methane. By converting the waste oil to diesel oil, we eliminate important emissions from the waste stream.

In regard to carbon emissions, however, there are other aspects of biodiesel and conventional diesel oil to consider. These are connected to production. A gallon of either produces about twenty-two pounds of carbon dioxide when it is burned, but the carbon dioxide emitted from the processes of extracting, transporting, and refining a gallon has to be added to get a true picture of the total carbon dioxide emissions.

Operations producing conventional oil can easily produce as much carbon dioxide as the oil itself. If the oil is extracted from tar sands, production emissions can be

two and a half times as much. This means that the carbon dioxide overhead of burning a gallon of diesel oil can range from somewhat over forty pounds, for conventionally-sourced oil, to about eighty pounds, for oil from tar sands.

By contrast, the overhead for processing waste vegetable oil is very small, increasing the emissions to considerably less than thirty pounds per gallon. However, if we reduce that amount by the savings to be had in reducing the waste stream emissions, the overhead of biodiesel may be very low indeed, possibly only a quarter to a half of those of ordinary diesel oil. Environmentally, biodiesel is clearly the winner, based on emissions.

By this spring, the plant had already been largely built, and much of the equipment had been brought in. Now, with its fund-raising goal achieved Co-op Power is good to go. Contractors will complete the structures. Final installation of the machinery will be done, the infrastructure will be made ready, deliveries of waste oil will begin, operators will start the chemical process of converting the oil to fuel, and distribution will begin.

Operations should begin this fall. At that point the system of collecting waste oil will be in motion. Restaurants will be providing



Northeast Biodiesel in Greenfield, MA. Photo courtesy of Co-op Power.

oil, some in exchange for marketing services or cash payments, though many have said they would simply donate the oil. There will also be drop-off points where anyone can donate oil.

As we consider all this, we should keep in mind is that the environment is not the only beneficiary of the operation. The owners of Co-op Power are nearly all local people and businesses, who benefit from its operations. Additionally, there will be employees of the plant who will get jobs, fifteen in all. Beyond that, a waste-to-fuel operation has very important benefits for everyone in the area where it operates. The cost of dealing with the waste is eliminated, because it is really no longer waste; instead, it has become a valuable chemical feedstock.

More important, the money paid for the fuel is no longer being exported from the area. The effect of this is that perhaps \$7 million of the money that used to be sent out of the area each year to pay for fossil fuels will instead be retained in the local economy.

Many thanks to our Sponsor





# SUSTAINABILITY PROGRAMS AT GREENFIELD COMMUNITY COLLEGE

By George Harvey

Greenfield Community College (GCC) has a set of sustainability programs. A Renewable Energy/Energy Efficiency option prepares students to work in energy and efficiency industries, and leads to an Associate of Arts degree (AA) or to a certificate. An Environmental Science/Natural Resources option can start a student off toward such areas as conservation science and environmental policy and also leads to an AA or to a certificate. A Farm and Food Systems option has courses ranging from Permaculture Design to Four Season Farming and Beekeeping, and leads to an AA.

GCC also has a Sustainable Agriculture and Green Energy Education Center (SAGE). It is associated with both the Renewable Energy/Energy Efficiency and Farm and Food Systems, but offers students and the extended community ways in which they can interact for the benefit of everyone involved. It enables contacts between students and potential employees, but it also provides resources for people outside the college who need them.

One thing SAGE does is to provide services for students in local primary and secondary schools. It is also affiliated with a number of other local organizations. For example, the SAGE program teaches organic gardening to women in transition in conjunction with two non-profit organizations in the Greenfield area. It also teaches organic gardening as a possible employment path to prison inmates. Peter Rosnick, the director of SAGE, points out, "Working with the soil is very healing. It is just what many people need to provide peace of mind."

While it might sound odd to group agriculture with energy efficiency, there is a reason behind it that makes good sense. Sustainability requires a special understanding and mind-set, and there is some overlap in skills among people who work in different disciplines relating to it. A person who has the ability to write a grant proposal for sustainable education is likely to be able to write one for renewable energy, as well. Also the organizations that are interested in supporting one are likely to be interested in the other.


SAGE is continuing to grow, and has different avenues under consideration for development. One is a super-efficient greenhouse. It could get extra winter heat from a solar-thermal system, and it would be super-insulated to maintain that heat. It would make it possible to expand courses in organic gardening.

GCC has more involvement in renewable energy and sustainability than a few educational programs and SAGE. The college has general goals of its own. It has installed solar photovoltaics with a capacity of 81 kilowatts. They generate about 79,800 kilowatt-hours, saving the college over \$11,000, each year; they have prevented about 180 tons of carbon dioxide from being emitted. The system was installed by Pioneer Valley Photovoltaics.

GCC also has its own energy efficiency program. This has reduced energy expenses for the college by over 40%. The GCC goals are to reduce the carbon emissions, including not only its own emissions but those of other community members as well, and to provide a path to a sustainable future for everyone.

For more information, go to [www.gcc.mass.edu/sustainability/programs](http://www.gcc.mass.edu/sustainability/programs).

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## NET-ZERO AWARD FOR HOME IN GREENFIELD, MA

By George Harvey

The home of Hannah Smeltz and Spartan Giordano of Greenfield won the North East Sustainable Energy Association's (NESEA) 2015 Zero Net Energy Building Award. One thing interesting about the project is that it was the first house built by Giordano, a former math teacher. Though he had no hands-on experience with building, Giordano knew a fair amount about renewable energy, as he had been through the Greenfield Community College Renewable Energy Program. He also got a fair amount of help from friends and contractors.

The 1,500 square-foot saltbox home was built at a cost of \$145,498, but there was a good deal of savings along the way. Giordano did much of the labor himself, bringing down the cost. Other things that reduced costs included use of reused or recycled materials. The foam board used to insulate the foundation was recycled. Most doors and windows were purchased used. The tiles



This home in Greenfield, MA, won the NESEA 2015 Zero Net Energy Building Award in the spring of this year. Photo courtesy of NESEA.

for the first floor are scrap granite. The walls are 12.5 inches thick, and are insulated with recycled fiber from newspapers.

The heat is nearly all passive, and all living

space in the house has south-facing windows for solar gain. There is one Mitsubishi MSZ-FE12NA heat pump, but it rarely goes on. The house has heat-recovery ventilation, which also allows clothes to be dried by hanging inside, reducing energy use without causing humidity problems. Hot water is supplied by two panels in a drain-back solar hot water system. The panels are Sunearth EC-40, and the tank is HTP Contender.

All power for the house comes from the sun. A 4.5-kilowatt photovoltaic array on the roof produced 5,144 kilowatt-hours (kWh) in the first year. The house actually produced 503 kWh more than it used, meaning it is net-positive.

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winter and comfortably cool in the summer, and it achieves this without using any fossil fuels at all. The cost of running it is minimal, and the cost of building it was not high. It even offsets other people's carbon emissions by putting energy on the grid. We might agree with NESEA about this home. It deserves an award.

## A Few Notes on Greenfield, Massachusetts

By Green Energy Times Staff

Over the years, Greenfield has been a leading community in energy, efficiency, and sustainability. Five from recent history might be taken as representative.

The Northeast Sustainable Energy Association (NESEA), which had originally been based at MIT, moved its headquarters to Greenfield in 1994, taking up residence in a former railroad administrative building. NESEA's annual conference in Boston is one of the most important sustainable energy events in the Northeast. Its activities include the American Tour de Sol, which demonstrates solar-powered cars. It opened the Greenfield Energy Park, now a city park, in 1999.

The Solar Store of Greenfield opened in 2005. Claire Chang and John Ward, who joined the store in 2008, bought it in 2011, raising it to a new level of excellence. Visitors have always found the store an easy place to become more energy-aware. Chang and

Ward have made it even easier for everyone to move to a more sustainable and resilient lifestyle, and have been central of moving Greenfield forward toward that goal.

In 2008, Rural Development, Inc. began to develop Wisdom Way, a set of ten highly energy-efficient duplexes of two to four bedrooms. The prototype was a highly efficient home with solar power in Colrain, Massachusetts, finished in 2007. Wisdom Way was completed in 2010. It became a subject of study by the US Department of Energy, which found that the apartments had total utility bills for heat and electricity ranging from \$14.25 to \$38.17 per month.

Greenfield was the first community in New England to install a solar farm on a retired landfill. The two kilowatt (kW) plant produces about 2,400,000 kWh of electricity per year. The city gets 40% of its power from the solar farm, for which it pays 1¢ per kilowatt hour. The plant went online in 2012.

In 2014, the town of Greenfield partnered with PV Squared to have a Greenfield Solar Challenge. The program generated 197 inquiries, of which 113 produced proposals. There were fifty-eight projects undertaken, of which three were commercial and fifty-five residential. At present, installation is still under way.

The total capacity installed under the program will be 508.65 kW, of which 145 were commercial and 363.65 were residential. This is bringing the amount of private solar power in Greenfield to a multiple of what it had been.

Next issue of Green Energy Times will include another Greenfield story -- in our *Dining in the Green* section. We will be featuring, *The People's Pint*. It's a great place you will likely want to visit for a meal.

Pictured are: Clair Chang and John Ward, owners of the Solar Store of Greenfield. Photo courtesy of Clair Chang.





# The Energy Efficient Comfort of Radiant Floor Heating

by Roddy Scheer and Doug Moss

Underfloor radiant heating involves under-laying the floor with a hot element or tubing that transfers heat into the room via infrared radiation and convection, obviating the need for forced or blowing air.

According to the U.S. Department of Energy's Energy Savers website, radiant heating has a number of advantages over other forms of heat distribution: "It is more efficient than baseboard heating and usually more efficient than forced-air heating because no energy is lost through ducts." It is also flexible as it can run off of a variety of energy sources: gas, oil, wood, solar and other sources or combinations thereof can feed radiant systems. And radiant heating is a good choice for those with severe allergies as no potentially irritating particles get blown around the room.

Several aspects of radiant heating make it more energy-efficient. For starters, the uniform heat distribution over the entire

surface of a floor heats the lower half of the room, enveloping inhabitants in warmth at a lower overall temperature—in some cases up to five degrees Fahrenheit cooler—than a conventional heating system. "Radiators and other forms of 'point' heating circulate heat inefficiently and hence need to run for longer periods to obtain comfort levels," reports the Resi-

dential Energy Services Network (RESNet). "They draw cold air across the floor and send warm air up to the ceiling, where it then falls, heating the room from the top down, creating drafts and circulating dust and allergens." RESNet adds that radiant systems transmit heat on average some 15% more efficiently than conventional radiators.

The efficiency gains can be magnified significantly with good insulation and a well-designed system. While tearing out old heating systems or replacing decent existing flooring might be overkill for the sake of moving to radiant heat, those embarking on new building projects or contemplating major renovations should certainly consider it.

cont'd on p.24

According to the U.S. Department of Energy, radiant underfloor heating is more efficient than baseboard or forced-air heating and can run off of a variety of energy sources. It is also a good choice for those with allergies as no potentially irritating particles get blown around the room.



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# HEAT PUMP CLOTHES DRYERS

*New Cutting Edge Appliances Use 40% Less Energy!*

By N. R. Mallery



Neale Lunderville, General Manager of BED, Liz Gamache, Director of Efficiency Vermont, Lee Owen, Bouchard-Pierce General Manager. Photo courtesy Efficiency Vermont

A winner of the 2014 ENERGY STAR® Emerging Technology Award, heat pump clothes dryers combine the cutting edge efficiency of heat pump technology with one of the highest energy-using appliances in the home.

According to the U.S. Environmental Protection Agency (EPA), clothes dryers use more energy than any other large appliance in the home. From 2006 to 2010 an average of 9,538 dryers were sold annually in Vermont, of which 87% were estimated to be electric. This year the first-ever ENERGY STAR labeled clothes dryers are hitting retail floors, including several heat pump dryers, which use approximately 40% less energy than a regular electric dryer.

Unlike traditional dryers that pull room-temperature air in, heat it up, and vent it outside, heat pump dryers save energy by using a closed system to dry and recycle hot air before returning it to the drum. Heat pump dryers also use lower temperatures and advanced moisture sensors to prevent over-drying and damage to clothes.

Efficiency Vermont and Burlington Electric Department (BED) offer an incentive on this new technology. A \$400 rebate is available on all ENERGY STAR 2014 Emerging Technology Award winning electric dryers. Among these winners are the

Whirlpool® HybridCare™, LG® EcoHybrid™, and Kenmore® Advanced Hybrid Dry models. The LG model was the first heat pump dryer to be displayed in a Vermont retail store when it arrived at Bouchard-Pierce in Essex Junction, VT; it is now also available at Bouchard-Pierce in Berlin, VT. Total Home Center in St. Albans, VT, Cocoplum Appliances in Essex Junction, VT and Brattleboro, VT, and Brook Valley Appliance in Manchester Center, VT currently have the Whirlpool heat pump dryer on display. David Perry, from Perry's Appliances in Bradford, VT confirmed that they carry both the LG and Whirlpool Brands of heat pump dryers.

Efficiency Vermont is working closely with retail partners across the state to make these dryers more widely available. Heat pump dryers are more expensive than traditional electric clothes dryers (MSRP \$1,599 to \$1,899); however with special sales in store, the \$400 rebate, and the significant energy savings, they are a competitive product and a smart investment. Some Vermonters have already taken advantage of the rebate – and the switch from a traditional electric dryer to a heat pump dryer is expected to save them \$600 over the life of the appliance.

Samuel Atwood of West Dover, VT purchased a heat pump dryer and was one of the first to take advantage of Efficiency Vermont's rebate. "I chose the heat pump dryer because it is super-efficient and will significantly reduce my energy consumption. The cost of a similar electric dryer, after the rebate, was nearly identical, so I'm already pocketing the energy savings," said Atwood. "It was also easy to install and is a great quality product."

To learn more about Efficiency Vermont's rebates on energy efficient clothes dryers and to find a participating retailer, visit [www.encyvermont.com/dryers](http://www.encyvermont.com/dryers). BED customers can visit [www.burlingtonelectric.com](http://www.burlingtonelectric.com) to learn more about BED's energy efficiency services.

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# Tesla's New Neighbor Puts Efficiency in Your Home

By N. R. Mallery



Delta's new headquarters in Fremont, CA. Photo courtesy of Delta.

I have used Delta's bathroom fan in my own home and love it because the light is wonderfully bright and the fan is oh-so-quiet. I even use it to vent hot air that gathers on the second floor on hot days during the summer.

While it's very easy for me to think of this as a company that makes energy-efficient bathroom fans, look at what they have accomplished.

The new Delta Americas LEED Platinum headquarters building in Fremont, CA will begin operations in approximately six months. The 200,000-square-foot facility is less than two blocks from the current HQ location and about one-half mile from the Tesla Motors factory.

The building is targeted for net-zero energy by incorporating Delta's own energy-efficiency and renewable energy systems along with other "green" technologies:

- Delta Breez ventilation fans
- 620kW rooftop solar system: includes 93 of Delta's inverters
- Seven Delta EV Chargers: six level 2 and one fast DC
- Elevator Power Regeneration System: Delta's active front ends (AFEs) and variable frequency drives (VFDs)
- Ground source heat pump: heating and cooling

- Active Chilled Beam: heating and cooling
  - LED Lighting: office, parking lot and warehouse
  - Ecological ponds: including a water bio-retention pond
  - Rainwater harvesting collection system
- The facility speaks to Delta Group's ongoing company mission "To provide innovative, clean and efficient energy solutions for a better tomorrow."

Delta Group is the world's largest provider of switching power supplies and DC brushless fans, as well as a major source for power management solutions, components, visual displays, industrial automation, networking products, and renewable energy solutions. Established in 1971, Delta Group has 31 manufacturing plants and 54 R and D labs globally. Its U.S. operation is headquartered in Fremont, CA.

*Their continuing line of innovative energy-efficient products are now available in NH, VT, MA, and NY. For information on where to purchase, call DeltaBreez at 888-979-9889 or email breezsales@delta-corp.com.*



## Radiant Floor Heating

cont'd from p.22

According to TLC Network's Green Living Guide, there are two main types of radiant heating, electric and hydronic. In the former, wires that create heat by electrical resistance installed in the floor radiate heat upward. This type of radiant heat is most commonly used to retrofit a single room—especially a bathroom or kitchen—in an older house or building. For comparison, hydronic radiant heating, whereby heated water is forced through tubes under the floor, is more often designed into a new structure, and is more energy-efficient overall.

TLC points out that while radiant heat is definitely more practical in smaller, snug homes with lower ceilings, it might not always be the greenest solution in homes with bigger rooms. "In some scenarios it can be less energy-efficient than forced-air heating." TLC recommends consulting with

a reputable heating contractor to see if radiant heating is a sensible way to go.

Of course, pairing a radiant heating system with an energy efficient EnergySTAR-approved programmable thermostat can indeed save households hundreds of dollars a year on home heating bills while keeping inhabitants warmer all year long. Many states offer financial incentives to upgrade home and commercial heating systems in ways that boost energy efficiency. Check out the free Database of State Incentives for Renewable Energy (DSIRE) to find out what kinds of tax rebates or other incentives might be available in your neck of the woods.

Contacts: Energy Savers, [www.energysavers.gov](http://www.energysavers.gov); RESNet, [www.resnet.us](http://www.resnet.us); TLC Network Green Guide; DSIRE Database, [www.dsireusa.org](http://www.dsireusa.org).

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# CLIMATE CHANGE & THE DREADED "POINT OF NO RETURN"

## WHEN WILL WE HAVE GONE TOO FAR?

by Doug Moss & Roddy Scheer

While we may not yet have reached the "point of no return"—when no amount of cutting back on greenhouse gas emissions will save us from potentially catastrophic global warming—climate scientists warn we may be getting awfully close. Since the dawn of the Industrial Revolution a century ago, the average global temperature has risen some 1.6 degrees Fahrenheit. Most climatologists agree that, while the warming to date is already causing environmental problems, another 0.4 degree Fahrenheit rise in temperature, representing a global average atmospheric concentration of carbon dioxide (CO<sub>2</sub>) of 450 parts per million (ppm), could set in motion unprecedented changes in global climate and a significant increase in the severity of natural disasters—and could represent the dreaded point of no return.

Currently the atmospheric concentration of CO<sub>2</sub> (the leading greenhouse gas) is approximately 398.55 parts per million (ppm). According to the National Oceanic and Atmospheric Administration (NOAA), the federal agency tasked with monitoring the health of our oceans and atmosphere, the current average annual rate of increase of 1.92 ppm means we could reach the point of no return by 2042.

Environmental leaders point out that this doesn't give us much time to turn the tide. Greenpeace, a leading environmental advocacy group, says we have until around 2020 to significantly cut back on greenhouse gas output around the world—to the tune of a five percent annual reduction in emissions overall—if we are to avoid so-called "runaway" climate change. "The world is fast approaching a 'point of no return' beyond which extremely dangerous climate change impacts can become unavoidable," reports the group. "Within this time period, we will have to radically change our approach to energy production and consumption."

In a recent lecture at Georgetown University, World Bank president Jim Yong Kim reported that whether we are able to cut emissions enough to prevent catastrophe likely depends on the policies of the world's largest economies and the widespread adoption of so-called carbon



If we don't get our carbon emissions in check soon, it could be too late for the polar bear and many other species impacted by global warming. Credit: Gregory "Slobidr" Smith, FlickrCC

pricing systems (such as emissions trading plans and carbon taxes). International negotiators scheduled to meet in Paris next December are already working to hammer out an agreement mandating that governments adopt these types of systems to facilitate emissions reductions. "A price on carbon is the single most important thing we have to get out of a Paris agreement," Kim stated. "It will unleash market forces."

While carbon pricing will be key to mitigating global warming, Greenpeace adds that stemming the tide of deforestation in the world's tropical rainforests and beyond and adapting our food systems to changing climatic conditions and increasingly limited resources will also be crucial to the health of the planet.

"Without additional mitigation, and even with adaptation, warming by the end of the 21st century will lead to high to very high risk of severe, widespread and irreversible impacts globally," reports the Intergovernmental Panel on Climate Change (IPCC), an international group of leading climate experts convened by the United Nations to review and assess the most recent scientific, technical and socio-economic information on global warming. Indeed, there's no time like the present to start changing our ways.

Contacts: NOAA, [www.noaa.gov](http://www.noaa.gov); World Bank, [www.worldbank.org](http://www.worldbank.org); Greenpeace, [www.greenpeace.org](http://www.greenpeace.org); IPCC, [www.ipcc.ch](http://www.ipcc.ch).

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- Neighborhoods with well-shaded streets can be up to 6–10° F cooler than neighborhoods without street trees, reducing the heat-island effect (see illustration below), and reducing energy needs. (U.S. Forest Service Center for Urban Forest Research)
- Shaded parking lots keep automobiles cooler, reducing emissions from fuel tanks and engines, and helping reduce the heat-island effect in communities. (U.S. Forest Service)
- Trees not an option because of large paved lots? Install solar as canopies to park under. Generate clean energy for lighting with the excess being sent to the grid. Keep cars cooler, and reduce idling for a/c.



# The Community-Scale Permaculture Farm

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By Josh Trought, 416 pages, Chelsea Green Publishing, \$40. Copyright 2015.

Book Review by George Harvey

*The Community-Scale Permaculture Farm* is a resource book for anyone who wants to understand or practice permaculture. While it is aimed at practice at the community scale its value is certainly not limited to that. The underlying philosophy of permaculture, its scientific logic, its formidable ethics, and its passionate concern for everything in nature are truly boundless in application.

This book tells the story of a permaculture farm started in 1997 near a tiny New Hampshire village. Since that time, D Acres has been an ongoing research program, investigating better ways of doing things with both soil and things that life on it. As such, the farm has become a learning center, where those interested can discover how to apply the principles of permaculture to their own farms, gardens, and lives. In the course of that work, those who learn can apply the principles to all aspects of life, because permaculture is not limited to a practice of organic farming, its applications are much broader and holistic.

The educational resources at D Acres are not limited to gardening. They include a variety of skills ranging from metal working, wood working, and cob building to community life. That being the case, societal aspects of life are important, and these range from economics and structures of organizations to the arts.

*The Community-Scale Permaculture Farm* tells the history of D Acres from its start, when its author was one of the farm's founders. It also deals with the technology of holistic, organic farming. But it is not limited



to those things. It covers green appliances, green goods, and green living. One of the topics dealt with in detail is transforming forested landscapes into arable land, including cooperation from such allies as the pigs. Another is getting the maximum benefits from

the farm without negative impact on the ecological systems that exist within it. Since the book specifically looks at the community, it includes a look at fair and effective community governance. And, of course, it necessarily takes a look at both how we fit into the community and how the community fits into the world.

If you would like to build a solar dehydrator, you will find a discussion on that subject. The same is true if you want to build a pond. And importantly, the same is true if you want to build a community. In fact, if you want to build a better world, this book provides a great starting point. We could imagine going from permaculture communities to a permaculture world.

We are told that Josh Trought spent seven years writing *The Community-Scale Permaculture Farm*. Much of that effort was spent in the practice of living what he was preaching. Both the effort and the intimacy with the subject have contributed to a book worth buying, reading, and maintaining as a resource in the library.

# PLASTIC-FREE Revised & Updated 2015

## How I Kicked the Plastic Habit and How You Can Too

By Beth Terry, 375 pages, Skyhorse Publishing, plastic-free binding \$16.99.

Book Review by N. R. Mallery

This is an updated edition of Beth Terry's 2012 book. In it, she continues her quest to live plastic-free. "Most books," said Terry, "are full of plastic." Most of us are unaware of this, until we pick up this book, and then we immediately note the natural, uncoated cover, and that the spine is unbound. The book's pages are stitched with cotton thread and binding is finished with plastic-free glue.

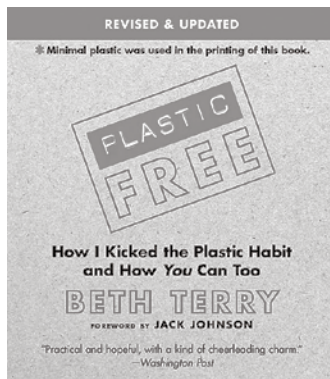
Thus, your first exposure to the book makes you understand that plastic is everywhere! You come to see why trying to get away from plastic could seem daunting. To accomplish what the author has done in her own life to kick the plastic habit, is a real eye-opener.

The author's account of waking up to the plastic issue in her own life is humorously described. It led her to a shocking photo that changed everything. It was of a decomposed carcass of a Laysan albatross. The flesh of the chick had fallen away to reveal a rib cage filled with plastic bottle caps, disposable cigarette lighters and even

a toothbrush -- in a bird that was out in the middle of nowhere in the Pacific Ocean. Huge numbers of baby albatrosses die of starvation each year.

The day she saw that photo changed her whole life, starting by looking at her own personal plastic consumption. Shocked by the amount she was using, she figured out how to get around without all of this waste, that could eventually end up in one of three areas of the oceans called "plastic gyres." Beth has gone from personally generating almost four pounds of plastic waste per month to a little over two pounds per year! The average American generates between 88 and 120 pounds per year.

Her quest led her to a better lifestyle all around including eating habits. She learned much about plastic to which she had been oblivious, including the types of plastics and the good and the bad effects of each; the whole process of recycling; packaging; and the 4 R's: refuse, reduce, reuse and recycle. She says we should use the word refuse mostly as a verb instead of a



# DRIVING THE FUTURE

## COMBATING CLIMATE CHANGE WITH CLEANER, SMARTER CARS

By Margo Oge, former director of the office of transportation and air quality, epa

336 pages, Arcade Publishing, \$25.99. Copyright 2015.

Book Review by N.R. Mallery

"Dedicated to all individuals and organizations who are working for a cleaner and more sustainable planet."

Margaret Oge wrote this book for all of the right reasons. Oge and her numerous colleagues struggled for decades to implement regulations to reduce emissions from the transportation sector, knowing it is one of the major reasons for climate change.

Her thirty-two years of trials and tribulations are important to reveal for us all what is really going on behind the scenes.

The power that our government has upon our future for a sustainable planet can make or break us.

And while we can learn from the past and the many power struggles that the author's personal experiences make clear, the landmark deal with automakers in 2012, with direction from the Obama administration, has finally moved us in the right direction.

Chapter 15 concludes with a real glimpse of what the landmark deal means. Oge writes, "The move from vehicles powered by hyper-efficient combustion engines will be one of the most noticed transformations over the next few decades." She goes on to say, "After more than a century of near monopoly, vehicles powered entirely by gas or diesel will need to surrender the roadways to cleaner, alternative vehicles in just a few decades. To meet a 180-mpg average for new cars in 2050, all new vehicles sold in the US should be a mix of plug-in hybrids, battery electric and fuel cell vehicles. Any self-standing internal combustion vehicles (ICEs) in hybrid powertrains would have to run on low carbon fuels."

Unfortunately, what is proposed for the powertrains that drive vehicles will "stop



short of the reductions we need," Oge maintains. Additional factors that include aerodynamics, weight, strength and the importance of the tire rolling resistance will all be necessary in order to reduce our greenhouse gas emissions in time.

The tasks ahead of us may seem daunting and insurmountable at times. Oge states in the final chapter, "Future efforts will be even more important as we face the

most extraordinary environmental challenge of climate change. Our inaction will have devastating impacts on every corner of the planet and on each one of us, especially future generation. Climate change threatens our food supply, water sources, where we live and work, our national security, and our economy. We have a moral responsibility to act now, and history will judge us by how we as people, and governments, rise to this challenge."

I think this book is importantly revealing and will help to clarify why transportation issues in the USA have taken so long to address, the challenges we face today, and also the path that can lead us forward.

The hope for continued change is now in place thanks to the Obama administration and the perseverance of Margaret Oge. A hopeful future and what that might look like is portrayed in the beginning of the book, and Oge makes this hope seem real.

We can only pray the next administration does not change all of the advancements. I recommend that you all read this book. I could barely put it down. It's not only important information, it's that good.

## THREE DOWN ... TWO TO GO cont'd from p.1

knowledge and expertise, and they can get guidance on how to deal with the issue.

The progress toward a legally binding deal at the UN climate summit in Paris next December has been described as hopeful. Christiana Figueres has described it as being ahead of schedule. The marketplace cast a vote on the side of renewable energy when Tesla pre-sold over \$800 million worth of batteries in the first week after its line of batteries was announced. In the first third of 2015, less than 16% of all new electric capacity put on the grid in the United States was powered by fossil fuels. Efficiency is cutting into the fossil fuel market. Electric vehicle sales are

increasing. Oil prices are down because Saudi Arabia is pumping it as fast as they can, and they are doing that because they want to sell the oil before the world turns to other energy sources, according to a recently retired manager in the Saudi Oil Ministry.

At a moment when things might look pretty bleak for sellers of fossil fuels, three of the five Big Oil companies are calling for action on climate change. By doing so, they may get a place at the table, where they can take part in guiding policy. They are pragmatic, after all.

The letter from the oil companies to the UN can be seen at [bit.ly/oil-paying-for-carbon](http://bit.ly/oil-paying-for-carbon).

noun -- to refuse to use plastic.

And while Terry tells of her own plastic-free journey, she does not push it on readers, but hopes to simply help us to be more aware of just what we all are doing to this world around us and even to ourselves. The book includes many exemplary stories of plastic-free heroes, including an octo-

genarian woman, Jean Hill, from Concord, Massachusetts, and what she accomplished in her own community. Terry's research has been beautifully presented in this entertaining, educational, and thought-provoking book. We can all benefit by reading it and then sharing it with our own circle of friends and family.



# DEEP ENERGY RETROFIT MOISTURE MANAGEMENT IN CLOSED CAVITIES

By Michael Goetinck

About 20 years ago, an old time Yankee master carpenter told me, "Michael, it doesn't matter if water gets in as long as it can get out." In one sense he was right, but his experience was largely in buildings with high drying potential (i.e., no insulation, roof and siding intact, high air infiltration and exfiltration, lumber from old growth trees) as opposed to the homes that many of us want to create or retro-fit for high performance with currently available materials. I'll update his statement by saying that a building's ability to dry out needs to be greater than, or at least equal to, its potential for getting wet.

Bulk water has to be managed at the source because if it isn't, you won't have a high performance building. The other type of moisture that people and building codes spend a great deal of time addressing is vapor. Moisture in vapor form should also be managed at the source through the use of vapor retarding membranes and mechanical ventilation. The closed-cavity building assemblies should be constructed in such a way that if diffusional moisture gets into them they have the ability to dry before damage occurs. This approach ensures the health and safety of the building and its occupants. Below, I've outlined an approach that I've found to be successful.

## BULK WATER

All of the grade, foundation, roof, and wall details have to be done in such a way that bulk water does not enter the building. If there is no way to prevent it from coming into the basement ( rubble-stone foundations, springs running through the basement, etc.) then it can be managed by installing a drainage system in the basement that allows a way for water to leave the building without it affecting the building's assemblies.

## VAPOR

This can come from a number of sources, including cooking, bathing, house plants, pets, and people. It can also come from basements and crawlspaces. Mechanical ventilation; whether it's at the source (bath and kitchen fans), whole-building (heat recovery ventilation), or a combination of the two is important to install. These systems can be sized for the anticipated loads. Barriers below grade to cover dirt or concrete floors and foundations will prevent vapor from getting into the basement or crawlspace. All of these

methods will work to keep interior relative humidity low enough (certainly below 50%; preferably closer to the 20-30% range) that diffusional moisture becomes more easily managed.

## DIFFUSIONAL MOISTURE

A closed-cavity assembly that is vapor-open on at least one side and filled with hygroscopic insulation will give the best results. Assemblies designed to dry to the interior need to be constructed using a membrane with high diffusional tightness during the heating season and high diffusional openness during the rest of the year. The best hygroscopic insulation material is 100% borate- treated cellulose. By using these materials in concert, any moisture that gets into the assembly will spread throughout the insulation without harming it or significantly reducing its ability to insulate and dry out before the durability of the building is compromised.

*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.*



Exterior vapor open membrane with vertical strapping to create a rain screen. Photo by Michael Goetinck.



Interior smart vapor retarding membrane. Photo by Michael Goetinck

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# Deep Energy Retrofit in Montpelier Achieves Net-positive Results

By George Harvey



Deep energy renovations by Montpelier Construction have taken this Montpelier, VT home to a net-positive status. They make more energy than they consume! Note the solar system far right. Photo courtesy of the owner.

A recent retrofit in Montpelier, Vermont is notable, partly because the house was a prime candidate for improving efficiency, and partly because of what the retrofit achieved.

The house is what is called an atomic ranch. In the middle of the last century, this style was thought very modern. It typically has a low roof with wide overhangs and an emphasis on picture windows. While this combination may be featured in many

solar homes, it will only work for that purpose if it is engineered properly, and the chance of doing that by accident is pretty small. In this case, the orientation of the house was with a north-south roof axis and the overall design did not have solar heat in mind. This meant that the four picture windows represented a large area for heat to be lost.

Adding insult to injury, the insulation was inadequate, and the house air sealing was poor, by modern standards. In time, a garage was added on the south side of the building, further reducing the possibility of any solar gain. With the garage, the area of heated space was increased to 4000 square feet.

When the house was built, in 1962, it had a very modern heating system. It was entirely electric. When that turned out to be expensive, an oil furnace was installed with base-board hot water heat. Though the boiler was very efficient, for the time, it did not bring the building to anything like the modern standards. Recently, the house has often been empty during the winter, but even so, with all its inefficiencies it was burning 2300 gallons of oil per year.

Aside from the fact that it looked ultra-modern to people in the era that produced "The Jetsons," this house was in many ways like the vast majority of the older houses in the Northeast. It is representative of the problems many homebuyers face with

older buildings.

Now, the atomic ranch has undergone a deep energy retrofit, largely with the guidance of Malcolm Gray of Montpelier Construction, located in Barre, Vermont. The structure itself was altered for efficiency. Each of the four picture windows, which were six by five feet, was replaced with a pair of casement windows. A bow window also was replaced the same way. All windows and doors were upgraded with Passive House certified products. The new windows were from Klearwall, in Ireland, and have tempered glass with an insulation value of R-11. New doors were from the same source, with similar levels of efficiency.

Air Infiltration was reduced by two-thirds, with numbers for blower door tests being reduced from 4800 cubic feet per minute to 1630. The number of air changes per hour was reduced from 0.8 to 0.25. A tight house needs to have controlled ventilation to bring in air that is pre-heated by extracting heat from the outgoing air. It also needs moisture control. These needs were addressed with an energy recovery ventilation system by Memphremagog Heat Exchangers in East Montpelier.

New insulation was installed, of course. The roof got twenty-four inches of blown cellulose bringing it up to an R-90. A two-to-three-season sun room, was given five inches of polystyrene, only an R-20, but a large improvement over solid brick, and all insulation of the house was improved.

The heating system was replaced by a ground-source heat pump with three wells, each 150 feet deep. Though this is probably the most efficient active heating a house can get, it is an expensive installation. The decision to install a ground-source heat pump was at least partly based on tax incentives that were not available for air-source systems.

The heat delivery system for the basement and ground floor were replaced with one made by Myson Comfort. The old hot water baseboard heaters in the split level and second floor were retained in use.



Electricity for the house is provided from a ground-mounted 10-kW photovoltaic array installed by Sustainable Solutions of Marshfield, Vermont. The panels can be seasonally adjusted for tilt. A backup propane powered generator was also installed.

Asked whether the house has net-zero energy use, Malcolm Gray said, "The system is too new, and the numbers are not all in." But in the meantime, he is hoping to find it is net-positive.

Learn more about Montpelier Construction and their expertise with deep energy practices at [montpelierconstruction.com](http://montpelierconstruction.com), or call them at 802-229-6575.



Super efficient windows from Ireland. Photo courtesy of Malcolm Gray, Montpelier Construction.



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# -- SURVEY RESULTS -- Homebuyers Want Energy-Efficiency

**Millennials Are Willing to Pay More for an Energy-Efficient Home**

National Association of Home Builders (NAHB) surveys indicate that energy efficiency and sustainability are among the most-wanted features of home buyers and that builders are responding to this demand.

"Our builder members are telling us that more and more buyers are looking at new homes for their efficiency in design and functionality," said NAHB chairman Tom Woods. "Whether it's improved insulation or sustainable building materials, today's new homes can reach higher energy performance and greater durability than was possible even 20 years ago. And programs like the National Green Building Standard help consumers achieve their efficiency needs."

As more millennials enter the housing market, they are sharing what features are most likely to affect their home buying decisions. An NAHB survey revealed that Energy Star certifications are a priority for these home buyers. In fact, 84% of millennials are willing to pay two to three percent more for an energy-efficient home as long as they can see a return on their energy bills.

NAHB also surveyed home builders about the features they are most likely to include in new homes they build this year. Top features include Energy Star-rated appliances and programmable thermostats.

Some home buyers are looking for even more sustainable features, prompting an increasing number of single-family and multifamily builders to deliver green homes. Green builders incorporate energy, water, and resource efficiency; improved indoor air quality (IAQ); and sustainable and locally sourced products into their projects.

An NAHB survey of single-family home builders revealed that nearly 25% of builders installed alternative energy-pro-



Transformation's award winning custom house at 14 Cavite St., Devons Green, MA. Photo courtesy of Transformations Inc., Townsend, MA.

ducing equipment in new construction. This includes geothermal heat pumps and photovoltaic solar panels. The current 30% tax credit available for homeowners who install this equipment is set to expire at the end of 2016, which makes this a good time for interested buyers to consider purchases.

For more information, visit [nahb.org](http://nahb.org).

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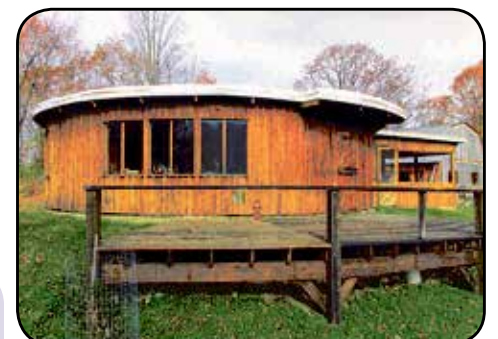
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# RenewAire -- Powered by Wind

By George Harvey



Inside RenewAire's new 100% wind-powered manufacturing plant. Certified by EnergyStar, LEED, and Green Globes. Photo courtesy of RenewAire -- Energy Recovery Ventilation.

RenewAire is a company based in Madison, Wisconsin that manufactures energy recovery ventilation (ERV) Products. Their products bring fresh air into a building, and vent stale air out. In that process, however, they recover most of the heat from the exiting air and use it to pre-heat the air coming in. They may also moderate extremes of humidity.

ERVs are important for just about any building with good air sealing. Since good air sealing may be the single most important aspect of energy efficiency in buildings, it is easy to see their importance. We will have an article on ERVs and how they work in the next issue of Green Energy Times. In the meantime, however, there are some interesting things to consider about RenewAire and its facilities.

RenewAire was founded in 1978 as Solar Specialists, by three people who were very much interested in renewable energy generally. In those days, solar photovoltaics were priced at about \$55 per watt, too expensive to be very important to anyone, aside from serious experimenters. Solar thermal, however, was already at a point where it was practical in some real-life situations, and that was where Solar Specialists started.

In a short time, more products were added to the company's product lines. Wind turbines became important products, and the company put up over a hundred of them. The company also put up the first grid-tied photovoltaics in Wisconsin. ERVs were added in 1983 and that line developed strongly. Finally, in

1995, the company found that ERVs had become such a great part of its line that it spun off all products other than ERVs into a separate company.

The company continued its interest in other facets of efficiency and renewable power. When its new plant was built, in 2005, the company got it certified under the EnergyStar, LEED, and Green Globes programs. Doug Steege, who was one of the Solar Specialists' founders and is now the RenewAire's Vice President of Business Development, explained the reason why the building was certified three times. "We needed to go through certification," he said, "to learn about the process." The management wanted to get the experience it would need to understand what its customers were going through with certification.

RenewAire's long-time attachment to renewable and sustainable power led it to procure their electricity from companies with dedicated renewable energy sources. These include Madison Gas and Electric Companies Green Power for Tomorrow and from Sterling Planet's, Green-e Wind renewable energy certificate programs.

Now, RenewAire is 100% wind powered. The electricity for the company is coming from the grid, but by buying renewable

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energy credits, RenewAire is specifying how that energy is produced and paying a bit extra for the privilege. It is all coming from wind farms, and a recent certification from the WindMade program makes that clear. Steege says of this, "There is no trick to this. Most customers can get 100% wind power if they want to. It is just a matter of doing it."

RenewAire's website is [renewaire.com](http://renewaire.com).

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# The Three 'P's FOR PERMACULTURE SUCCESS

If you plant it ... they will come.

By David Fried, Elmore Roots Nursery



Pollinator lane: if you plant it, they will come... Photos taken at Elmore Roots Nursery by David Fried

There are three things that start with a 'p' that are good to be thinking about: pollination, pollution and production.

One thing that we can do to make the world better by helping all three of these: planting. Here's how it works:

There are so many pollinators in our pear, plum and apple trees this week. I called a friend who is a filmmaker and asked him to film this. "Look," I said. "We don't have to have a fancy government program to get pollinators back into the fields and orchards. We simply have to plant fruit trees and berry bushes and they will come."

When customers and friends tour the grounds at our certified organic fruit tree and berry nursery, they see a lot of fruit. "You must keep bees," they say.

"Nope, we keep fruit trees and the bees feel welcome here because we are growing what they like." So our experience is, if you grow it, they will come...

Every fruit tree you plant and every berry bush is a mini solar collector turning sunlight into fruits and nuts, and trading us carbon dioxide for oxygen. Humans have never been able to develop a system that is more efficient than a plant's. The trees around your home and street are breathing in what we (and our cars and lawnmowers) breathe out and they give us fresh oxygen and shade and food. Not bad.

Another amazing thing about fruit and nut trees is you only need to plant them once. They stand there year round and their roots are mining the earth for their needs, while we can all be sitting on the porch sipping a lemonade. They give us fruit or nuts (almost every year), and oxygen and provide a natural habitat for native pollinators. Our main task is to give them space and protect them from harm. They are our allies and together we face and address the three 'p's: pollination, pollution and production.

The native fruit trees and berries are quite easy to grow and have very few challenges. I guess they have been around here long enough that their novelty has worn off on the deer, meadow voles and diseases that prey on the newer varieties introduced to Vermont fruits and nuts. Some that thrive here in Elmore, Vermont on our cold hillside with zero care are wild raisin viburnum, aroniaberry, the elderberry, the hazelnut and the juneberry.

The wild raisin (*viburnum lentago*) is a small tree or tall shrub which grows to about eight feet. It has white flower heads in the spring, blue-black fruits in the summer and red and purple leaves in the fall. We snack on them as we walk by and so do the songbirds. The fruit is not juicy and is thin around a seed, but it has a spicy flavor that reminds me of Thanksgiving pies. Wild raisins can grow almost anywhere including moist areas or light shade.

The aroniaberry (*aronia melanocarpa*) is a bushy shrub which grows to about five feet, has white flowers in the spring that become abundant juicy and slightly astringent fruit in mid-to-late summer. I have seen them growing on top of Owl's Head Mountain in Groton State Forest, and they also love our moist shady woods clearings. The berries have the highest rating for antioxidant phytonutrients, 10 times as high as broccoli.

The elderberry is a bushy shrub often seen along roadsides that also likes pond edges and can live in a more moist location than most plants. It grows well in well-drained areas, too and produces large clusters of purple berries in late summer and early fall. Old time Vermonters have told me they never get colds because they have frozen elderberry juice that they sip throughout the winter. I often harvest them by clipping the whole clusters into freezer bags, while above me the songbirds feast away.

The hazelnut is one of the few tall shrubs that can grow in partial shade. They have interesting catkins that hang down and tiny pink stars are the female flowers in spring. What a great flavor in September! You will want to harvest some when they begin to turn from light tan to a darker tan and bring them inside to finish ripening. The blue jays and squirrels are waiting until they are just right, too, so it is wise to bring some in before they do. Their leaves turn an awesome red-orange in fall and they make a great screen or windbreak.



Rt: After flowers are pollinated, the baby pears... Left: The native elderberry is fruitful, multiplies... is so good for us!

The juneberry (*amelanchier Canadensis*) is a small tree, to 15 ft. high or so, with a silvery bark that grows along forest edges and is the first tree to flower in the spring. The very tasty reddish purple fruits (blueberry-like) are good fresh or in cereal. It has rainbow colored leaves in autumn.

So plant natives and plant apples, pears and plum trees for pollinators and to fight pollution and for production of tasty fruits. We can be the gentle planters and caretakers of the world we want to see...

David Fried has been planting and growing fruit trees and nut trees and berry plants and natives in Elmore, Vermont at Elmore Roots Nursery for 35 years. Learn more at [www.elmoreroots.com](http://www.elmoreroots.com) or (802) 888-3305.

## EMERGING FRONTIERS IN BIOENERGY FOOD VERSUS FUEL biodiesel as part of sustainable agriculture

By Austin Robert Davis

Nationally, corn-based ethanol and palm oil based biodiesel are gaining negative attention for their impacts on the environment and food security. But here in Vermont, farms are producing on-farm biodiesel to power equipment and operations on the farm and the local farm community. This is a profoundly different model from national and international biofuel production. Agricultural Engineering and Agronomy Researchers at University of Vermont Extension, in partnership with farmers and the Vermont Bioenergy Initiative, have developed a model of local-minded, on-farm production of biofuels that can help rural communities transition away from unsustainable models of food, feed and fuel production.

verted engine or converted to biodiesel for use in a standard diesel engine. In this way, oilseed crops offer flexibility in the end-use of the products. US corn-based ethanol mandates are raising grain costs nationally, making feed expensive for Vermont farmers. Local bioenergy production means farmers produce their own feed, fuel, and fertilizer for on-farm use, at a fraction of the cost and more stable prices. Reduced and stable prices for feed, fuel, and fertilizer can mean improved economic viability for Vermont farms and more stable food prices for Vermont consumers in the future.

Overall viability can be seen in the local production for local use model by considering economics, energy and carbon emissions. Biodiesel production costs of between \$0.60 and \$2.52 per gallon have been estimated for farm-scale production models, which are generally below market price for diesel fuel. The net energy return in Vermont on-farm biodiesel operations has been estimated at between 2.6 and 5.9 times the invested energy (i.e. more energy out than was required to produce the fuel), demonstrating strong returns and potential for improvement with in-

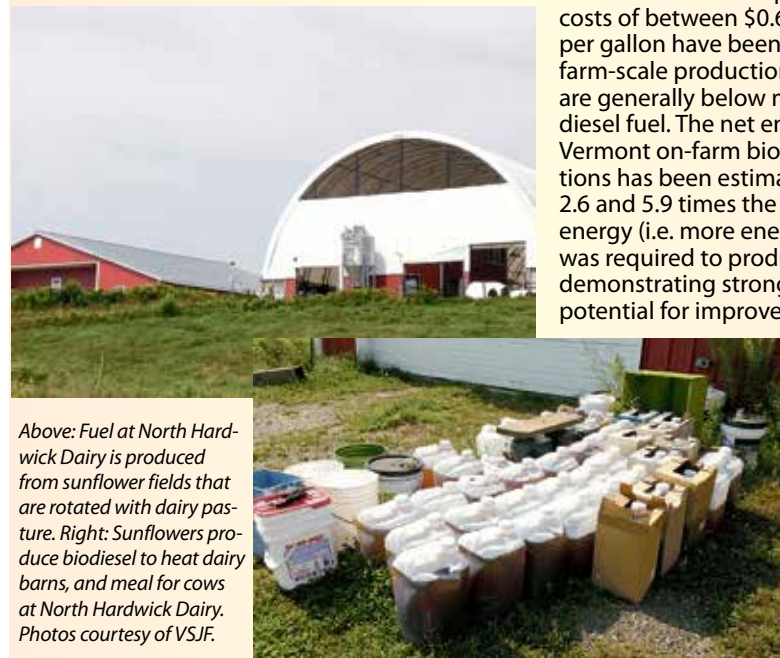
creased scale. Furthermore, oilseed-based production of biodiesel has been estimated to result in a net reduction of carbon dioxide emissions of up to 1420 lbs. per acre,

the equivalent of about 1500 miles of car travel per year.

Categorizing the Vermont biofuel model with national models and trends is inaccurate, considering the innovative and efficient systems benefiting Vermont farmers. While national and international analysis weighs the benefits of food versus fuel, the model is quite unusual in Vermont, and the food-versus-fuel challenge is well met. The model developed in Vermont does however have wider-reaching implications in that this can be replicated in rural farm communities across the US.

As John Williamson of Stateline Farm, a Vermont Bioenergy grant recipient says, "100 years ago everyone produced their own fuel; we are just doing that now in a different way." Deb Heleba is Sustainable and Organic Agriculture Program Coordinator, University of Vermont Extension.

Austin Robert Davis is an intern with the Vermont Bioenergy Initiative, a program of the Vermont Sustainable Jobs Fund that connects diversified agriculture and local renewable energy production for on-farm and community use. Learn more at [VermontBioenergy.com](http://VermontBioenergy.com).



Above: Fuel at North Hardwick Dairy is produced from sunflower fields that are rotated with dairy pasture. Right: Sunflowers produce biodiesel to heat dairy barns, and meal for cows at North Hardwick Dairy. Photos courtesy of VSJF.

National and global models of corn-ethanol and soy oil-biodiesel production are resulting in large-scale land conversions in some parts of the world, in particular to a loss of native grass and forestland. This type of biofuel production is not happening in Vermont, where bioenergy production incorporates rotational oilseed crops like sunflowers and soybeans on Vermont farms.

Locally produced biodiesel supports resiliency in Vermont, a cold climate state which is particularly dependent on oil. Over \$1 billion leaves the state for heating and transportation fuel costs. Heating and fuel independence by producing on-farm biodiesel provides farmers fuel security which is comparable to that which is sought by Vermont's local food movement.

The local production for local use model results in two products from one crop: oil and meal (animal feed or fertilizer). By growing oilseed and pressing the seed to extract the oil, farms are creating a valuable livestock feed at home, rather than importing it. The oil can be sold as a food product, used directly in a con-

**Editor's note** - Please shop and 'keep it local.' When you support your local and organic nurseries and orchards, you are supporting bees. They don't use the harmful pesticides that are killing them! We need our bees. Thanks for doing your part!



## Two Garden Product Reviews that Make Gardening Fun!

By N. R. Mallery

I love gardening, but when the weed's get ahead of you, it's easy to become overwhelmed. It can seem like you are fighting a losing battle against the persistent weeds.

When you grow organically, chemical weed killers are not an option. So in our quest for a natural way to bring the fun back into an otherwise grueling chore, we called two companies that had some tools that looked interesting: Cate's Garden and CobraHead LLC.

We received two items from Cate's Garden, garden knee pads and a compost thermometer.

The knee pads are great. They are light and comfortable. It's easy to forget you have them on. Now I can work in the garden just after it rains, without getting my knees wet. The pads stay right where you put them and don't slide a bit. They are now on my must-use list and get me out in the garden in all kinds of weather. There is a problem though: remembering to put them on or take them off! And clearly, they will help to make the knees in my jeans last longer! I really appreciate how different these kneepads are and use them nearly every time I go into the garden.

Cate's Garden's compost thermometer is very light-weight. At eighteen inches long, it can reach deep into the compost pile to check the inside temperature. The temperature readout dial is graduated from 40° to 180°, but the zones are marked "warm," "active," and "hot," to simplify what the temps mean.

It is vitally important for a compost pile be at the right temperature in order to kill weeds. Since I have several compost piles, this is a great aid, helping me plan which one to turn and when it is ready to use.

It's a must in a worm bin, I would think and may also be helpful to determine when the



soil is the warm enough to plant in a greenhouse or cold frame, for instance.

NOTE: Cate's Garden is offering G.E.T. Readers a 30% off discount for any of their products at Amazon.com. Use the coupon code "greent30" for any Cate's Garden product at checkout. *The Amazon page is at bit.ly/Cates-Garden-at-Amazon. Their website is catesgarden.com. 1-877-959-1817.*

Our second garden tool company we called was CobraHead LLC. They have a hand tool and a long-handled tool for weeding.

I would understate things by saying I am impressed with the CobraHead hand tool, and recommend it HIGHLY. If I had to pick a single tool to use in my garden, this is it. It takes a bit to learn ALL that you can do with it. My hand now feel empty without it.

There is nothing like the satisfaction of getting to the bottom of the long roots of quack grass that comes back again and again after notoriously breaking off and multiplying. I think there's a good chance of eliminating nearly all of them with this incredible tool. They just can't hide from the CobraHead! You can dig deep and around without disturbing your wanted plants. You can swipe across broad areas and just cut through the chase and say good-bye to massive amounts of spreading weeds in no time at all. I LOVE THIS TOOL!

I need to work with the long tool more, but it's hard to pry the original CobraHead out of my hands. However, to keep weeds down, the long tool does make it easy to pick off even the tiniest weeds while walking through the garden. Both tools are versatile for gardeners. With use it becomes more apparent. It would be a valuable tool for those that find it hard to bend down and get up.

Watch their videos and find out more at cobrahead.com. 866-962-6272.

## Permaculture Principles

By Kay Cafasso

Permaculture principles are essentially design guidelines gathered from observing nature. As a permaculture designer, I apply these principles to professional design work with land care, the built environment, food systems, and management of resources. As a permaculture educator, I find that applying them when designing the educational program itself enhances the learning experience for people seeking a greater understanding of how to apply ecological practices in their lives.

One principle is to design for functional interconnection, where we align elements for a mutual benefit. We match needs of one element with yields of others, thus creating many beneficial relationships, whether in a garden or classroom. During our Permaculture Design Certification Courses, participants are immersed in life at a well-established ecovillage. This allows for functional interconnection and networks of mutual support to form. Our needs for a community experience are



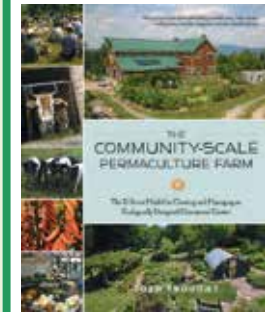
Photo courtesy of Kay Cafasso.

met onsite, which allows for the sharing of knowledge from all life stages, remembering skills of our ancestors, and learning from present pioneers about leadership and collaboration. Meanwhile, neighbors who need permaculture design services on their land benefit from the student design

## Local Permaculture in Practice

"What a broad-minded book and thorough record of achievement for a visionary farm enterprise... an inspiration for the next generation of growers" ~Peter Schumann, founder of Bread and Puppet Theater

see the review on pg. 25



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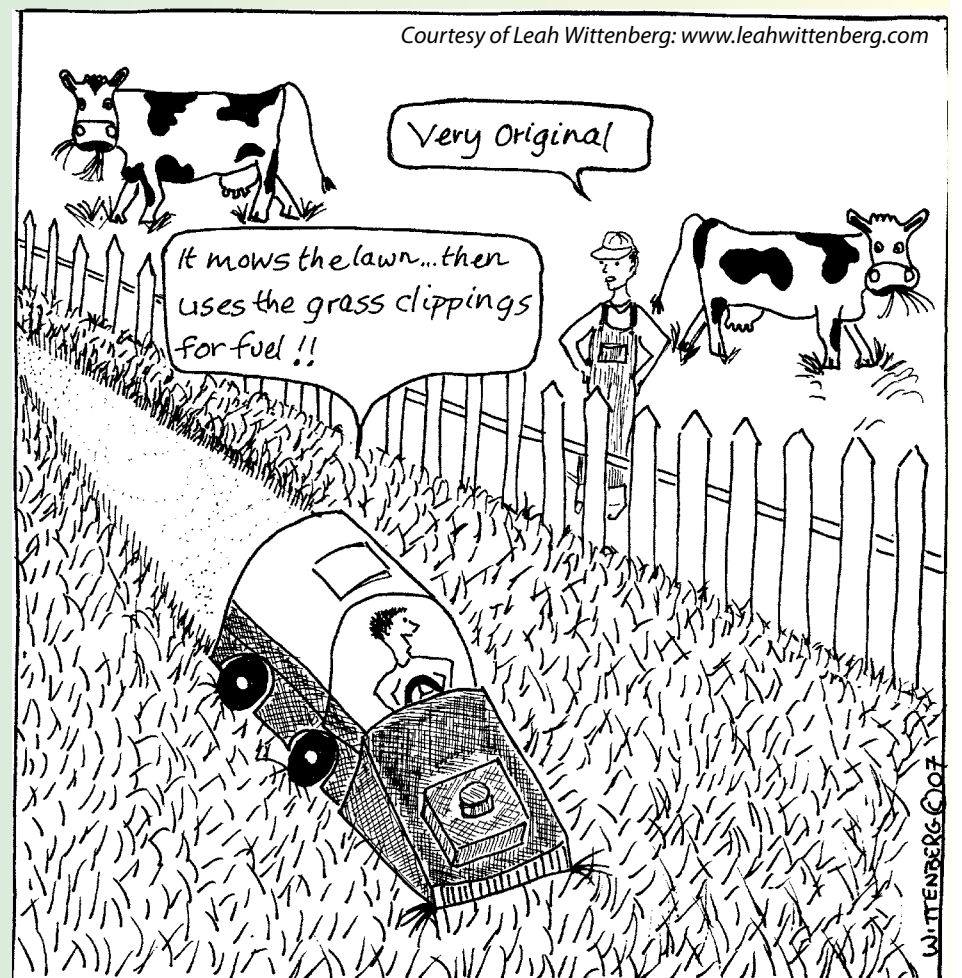
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work guided by our teaching team. Another principle that we incorporate is value feedback. When working with clients and landscapes, I am often reminded of this principle in the gardens. When I find myself cutting back a plant who has outgrown its allotted location, I realize that I

cont'd on p.35



Courtesy of Leah Wittenberg: www.leahwittenberg.com

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Painting by Gabe Tempesta



# MICRO-GARDENING: EVERYONE SHOULD DO IT



Micro basil forest. Photo by Jake Egolf

By Dane O'Leary

A garden limited to a very small space and intensively cultivated is called a "micro-garden." Urban dwellers have long been growing their own produce in such spaces. However, contemporary micro-gardening can be done in in any type of space, possibly using lined containers for growing plants, even indoors.

Micro-gardens can be operated almost anywhere with the proper accommodations. They also tend to need very little maintenance. They are fairly inexpensive to get started, and yet they can be sustainable and highly productive sources of fresh, nutritious organic produce.

Some people cannot imagine such a small garden can contribute significantly to a family's food supply. Nevertheless, studies by the United Nations Food and Agriculture Organization indicate that just one square meter can provide about 200 tomatoes each year, 36 heads of lettuce every two months, 10 heads of cabbage every three months, or 100 onions every four months.

Micro-gardening is most popular in urban areas where outdoor space is limited. Miniature gardens can be on balconies, patios, rooftops, and tiny yards. Despite being especially popular among low-income families and those living in urban areas, micro-gardening is for everyone. The requirements are very minimal: You need at least a square meter of space for best results. Seeds, compost, containers, and a desire to put in a minimal effort are most of what is needed. Yields are often much more than expected, providing surpluses.

Families can often repurpose materials for the garden from things found around the house. Potatoes can be grown in buckets, and many shallow-rooting plants can grow comfortably in medium-sized Tupperware containers. You should remember that whatever containers you use should be food-safe. If they are biodegradable, they should be lined so they do not decompose. A wooden container, for example will need a liner.

You can either buy a potting mix for soil (organic is best, but not required) or use some type of local "substrate" mixture made from such materials as peanut shells, rice husks, or coconut fiber, or laterite. You can fertilize with your own home-made compost.

Seeds are inexpensive and can be bought at hardware or garden stores, or online. If your micro-garden will be indoors in an area that doesn't have access to sunlight, you also need to install artificial lights, which can be less expensive than you might think.

Once your micro-garden is set up and seeds are planted, all you usually have to do is remember to water your plants and check regularly to monitor for signs of wilting, which would mean your micro-garden needs something it's not getting. Generally speaking, micro-garden maintenance is very minimal.

Micro-gardening also has positive environmental implications. We increase our sustainability and shrink our carbon footprints as we decrease our reliance on supermarkets and distant, conventionally operated farms by reducing use of fossil fuels and other petro-chemicals. We can use rainwater for watering, reducing the country's water needs, and even turn our food waste into compost.

Micro-gardening recalls a time when many of us ate only food we grew ourselves or got by trading our produce with other gardeners. Not only is the food superior, but it is more convenient. We can pull tomatoes off our own vines.

Micro-gardening is inexpensive to start, saves money, is highly productive, and easy to maintain. As the cost of living continues to rise, micro-gardening will be seen more and more as a solution that's not just efficient in terms of the environ-

ment, but also for providing a renewable supply of healthy, high-quality food at almost no cost. It offers a sustainable, renewable food source that can significantly reduce an individual's carbon footprint.

Dane O'Leary is a full-time freelance writer and design blogger for Modernize.com. He has degrees in psychology and anthropology.

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## Fracked Gas: Worse than Coal

Cont'd from p. 1

fracking is no better than coal. A little over three%, it's worse than coal.

So is it leaking that badly? Yep. And there are a whole host of peer-reviewed studies to prove it across the board. In

the Uinta Basin in Utah, scientists found leakage rates in natural gas fields were a whopping six to 12%. NOAA researchers in Colorado found leakage rates of four percent over gas fields, and that doesn't



In addition to Josh Fox and Lee Zeische being arrested, 19 other Seneca Lake Defenders were also arrested for protesting fracked gas storage in salt caverns under Seneca Lake. Photo courtesy of 'We Are Seneca Lake.'

include additional leakage in pipeline and distribution systems.

And yet another NOAA study done in L.A. basin found leakage rates at an astonishing 17%.

Switching from coal to gas is like saying "don't smoke cigarettes they are bad for you, here smoke this cigar instead and wash it down with some contaminated water and go ahead, share it with everyone in town," because as bad as fracking is for the big climate picture, it's even worse on local environments and communities.

Air pollution, water contamination, heavy truck traffic and earthquakes are just par for the course when it comes to fracking. Right now 15 million Americans within one mile of a fracking well and many more are being put at risk with expansion of fracked gas infrastructure like pipelines, gas storage, compressor stations, power plants and liquefied natural gas ports. This is infrastructure that will lock us in to decades more of heading down the wrong path.

Here's the good part of this problem: there is a solution. We have the technology to run our country on 100% renewable energy, and it's only getting more affordable, but we must come together as

communities and demand a renewable-energy, not fracked-gas, future.

True energy independence isn't foreign multi-national corporations, fracking and poisoning American communities. Energy independence is Americans making their own energy on their rooftops and community buildings. We can take back our power, as we take back our power.

There are very powerful and wealthy forces that are trying to force us down the wrong path, but working with the anti-fracking movement across the world, we've seen something more powerful – organized communities. It's time for the president who was elected by a grassroots movement to pay attention to the grassroots movement of citizens and scientists who are standing up and saying no to a fracked future.

Josh Fox is an American film director and environmental activist, best known for his Oscar-nominated documentary, 'Gasland'. He is one of the most prominent public opponents of hydraulic fracturing and horizontal drilling. A street is named after him in Aujac, France, a region where the French anti-shale-gas movement was born. Lee Ziesche is the Gasland Grassroots coordinator.



# HYBRID WIND-SOLAR SYSTEM FOR RAVENNA PUBLIC SCHOOLS IN NEBRASKA



*Pika's inverters handle a combination power from different sources, making it easy to demonstrate different kinds of renewable energy to students. Courtesy of Pika Energy.*

Pika Energy, of Westbrook, Maine, and GenPro Energy Solutions, of Piedmont, South Dakota, have completed the installation of the first integrated wind-solar hybrid installation at a public school in the United States. The hybrid energy system was installed for the Ravenna Public Schools in Ravenna, Nebraska. It was funded by a private grant.

Pika Energy manufactures residential wind turbines, wind-solar hybrid systems,

and equipment for small, versatile microgrid systems. GenPro Energy Solutions provides customized energy solutions, including solar photovoltaics. Combined, they had all the skills and equipment necessary to complete the unique installation.

Dwaine Uttecht, Superintendent of Ravenna Public Schools, can take pride in the school's new system. He said he was excited in the technology, partly because of the educational opportunity it gives the school's students. He explained, "We are able to easily see the energy output for the wind turbine and solar panel and use them as a

comparison with the traditional electricity consumption. We use this renewable energy at our Youth Center that is a safe place for students to work on homework and build relationships with their peers."

The hybrid system will generate power from both wind and solar for the Ravenna Public Schools. The installation includes a Pika T701 Home Wind Turbine and a ground-mounted solar array. These are connected in parallel to a Pika X3001

Hybrid Inverter. Rather than requiring a separate inverter for each energy source, Pika's REbus™ DC Microgrid connects both power sources to the utility AC grid through the larger central inverter. This approach is more economical than can be had from conventional systems. It offers flexibility in site layout and design, and enables smarter grid management. The school has access to information about all of its renewable energy sources and electrical loads from a single web-based interface.

Jeremy Anderson, GenPro's President, directed the installation team at Ravenna Public Schools. He said, "The integration of multiple renewable technologies allows us to offer a solution for our clients that maximizes independent energy production." Going on, he pointed out, "Pika's system offers two renewable technologies that absolutely complement each other."

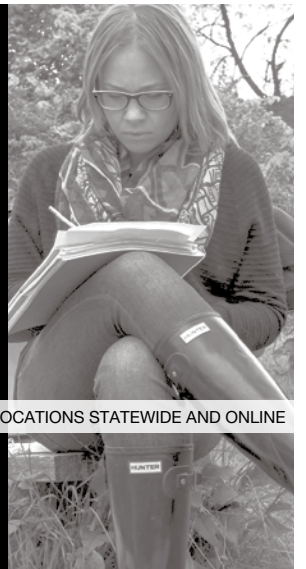
Ben Polito, President and Co-founder of Pika Energy, added, "Wind-solar hybrid energy systems are ideal for campus settings because they can make the most out of the resources available even on a small footprint. We are really proud to have our technology installed at Ravenna High School." He also commented on the educational value of the system, saying, "In addition to generating clean energy,

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our REbus Microgrid lets students monitor energy production, and hopefully get excited about a career in renewable energy."

Chip Means, Pika Energy's Director of Sales Development, said the system provides a small but significant part of the school system's energy needs. However, it also makes a statement that sustainable energy is important and gives students a real-world educational experience they otherwise would not get.

Pika Energy's website is [pika-energy.com](http://pika-energy.com). 207-887-9105.

Genpro Energy Solutions' website is [genproenergy.com](http://genproenergy.com).

## FRIENDS SCHOOL OF PORTLAND, MAINE NET-ZERO! 'PASSIVE' CERTIFICATION PENDING.

By George Harvey

Friends School of Portland is an independent Quaker school for preschool through eighth grade serving the area of Portland, Maine. Since its start, it has been on an island in Casco Bay connected to the mainland by a causeway. It is in Falmouth Maine, just north of Portland.

Perhaps a Quaker school on an island in Casco Bay sounds a bit unusual, but it does not tell the real story. This school is setting a standard in resilience, energy efficiency, and use of renewable power sources that are groundbreaking.

The school was founded about nine years ago, and has been in rented quarters since. They have not really been adequate to meet demand, and year by year, children have been turned away for lack of room. It was quickly clear the school needed its own quarters.

The school's board had some interesting resources immediately available to help with a new building. Naomi Beal, the Chair of the Building Committee, is also director of PassivhausMaine, the state's affiliate with the North American Passive House Network. This gave the committee immediate access to a wealth of information and expertise on energy efficiency and healthy environments.

In 2012, the school purchased twenty-one acres in a wooded area of Cumberland, Maine, the next town north of Falmouth. They quickly set about planning their new building. While a highly efficient school building was clearly a priority, it was unclear for a while whether any particular standard was to be used, let alone certification. Some people thought it a building at the cutting-edge for energy



*Artist's rendering of the completed Friends School of Portland. Courtesy of Friend's School.*

efficiency would cost too much.

Their first architects were specialists in conventional schools. These, however, were replaced by Kaplan Thompson Architects of Portland, who understood high performance efficiency standards. As the school continued to assemble their design and construction teams, however, it became more and more clear what the ultimate goal would be. They would go beyond the merely impressive and reach for the highest standard.

In the end, they decided the school building would be a net-zero-energy structure, and would also get Passivhaus certification. This made the Friends School

of Portland one of the very few schools in the United States to achieve Passivhaus certification. It also made it the largest building in Maine to reach that level.

Unsurprisingly, this produced a learning experience for more than one organization involved. The builder,

Warren Construction Group of nearby South Freeport, had experience with energy-efficient buildings, but had not worked on Passive House certified buildings. The same was true of Porter Building Systems of Gorham, Maine, the company that supplied the building's panelized walls.

Walls are rated at R-47, and have dense-packed cellulose between studs with four inches of rigid insulation on the exterior. Two sections of the roof are of two different configurations, one having twenty-six inches of loose cellulose for R-91, and the other with dense-packed cellulose sheathed on the exterior with four inches

of rigid insulation, for R-79. The foundation slab similarly has varying insulation. Windows are Intus Eforte triple-glazed uPVC units with a SHGC of 0.62 and a (glass only) U-factor of 0.1066.

Great energy efficiency in cold climates requires great air sealing, but that means ventilation needs to be carefully planned. Any efficient ventilation system recovers the heat from stale inside air and uses it to warm the colder, outside air it draws in. This is especially true in a building that will have a hundred people in it. The simple and relatively inexpensive RenewAire ventilation systems were the architects' choice.

Heating is provided passively, mostly from what is given off by normal daily activity. A Daikin minisplit air-source heat pump system provides any extra heat needed.

A 36-kilowatt array of solar photovoltaics will provide power. This was arranged by John Wasileski of OceanView at Falmouth, a retirement community. He is very interested in renewable energy and arranged the financing for the solar. The school will pay a reduced bill for solar electricity for six years, at which time the array will be paid down and will be acquired for low or no cost.

Head of School Jenny Rowe says she feels pretty confident that the new building will get its Passivhaus certification during the summer. And she is quite certain the new building will be functioning as a net-zero facility when school starts in the fall.

Friends School of Portland's website is [friendsschoolofportland.org](http://friendsschoolofportland.org).



## RESOURCES

**350-Vermont:** General group that coordinates a variety of statewide actions. To join this group go to: [groups.google.com/group/350-Vermont](http://groups.google.com/group/350-Vermont)

**American Council for an Energy-Efficient Economy:** Consumer guide to home energy savings - [aceee.org/consumer](http://aceee.org/consumer)

**American Solar Energy Society (ASES):** [www.ases.org](http://www.ases.org)

**Backwoods Solar:** Specialty: solar, off-grid - [www.backwoodssolar.com](http://www.backwoodssolar.com)

**Buildings Energy Data Book:** [buildingsdatabook.eren.doe.gov](http://buildingsdatabook.eren.doe.gov)

**Clean Power Estimator:** [www.consumerenergycenter.org/renewables/estimator](http://www.consumerenergycenter.org/renewables/estimator)

**Consumer Guide to Home Energy Savings, Heating, Appliances, Refrigerator Guide, Building Envelope, Driving:** <http://aceee.org/consumer>

**Dept. Public Svc. (CEDF):** [publicservice.VT.gov/energy/ee\\_cleanenergyfund.html](http://publicservice.VT.gov/energy/ee_cleanenergyfund.html)

**Dsireusa.com:** [www.dsireusa.com](http://www.dsireusa.com) Renewables & Efficiency. Find state, local, utility, & federal incentives for renewable energy & energy efficiency.

**Efficiency VT:** This is a must-go-to site for immeasurable amounts of info. [www.encyvt.com](http://www.encyvt.com)

**Energy Efficiency & R/E Clearinghouse (EREC):** [eetd.lbl.gov/newsletter/CBS\\_NL/nl6/Sources.html](http://eetd.lbl.gov/newsletter/CBS_NL/nl6/Sources.html)

**Energy Efficiency & Renewable Energy Clearinghouse (EREC):** [eetd.lbl.gov/newsletter/CBS\\_NL/nl6/Sources.html](http://eetd.lbl.gov/newsletter/CBS_NL/nl6/Sources.html)

**Energy Guide:** Unbiased advice about today's energy choices. Find ways to save, lower your bills & help the earth's environment - [www.energyguide.com](http://www.energyguide.com)

**Energy Star Federal Tax Credits:** [www.energystar.gov/tax\\_credits](http://www.energystar.gov/tax_credits)

**Federal Energy Regulatory Commission (FERC):** [www.ferc.gov](http://www.ferc.gov)

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**Find Solar:** [www.findsolar.com](http://www.findsolar.com)

**Fossil Fuel Freedom:** Group working to make Vermont's energy plan 100% free of fossil fuels: To join this group go to: [groups.google.com/group/fossil-fuel-freedom](http://groups.google.com/group/fossil-fuel-freedom)

**Greywater Info:** [www.oasisdesign.net/greywater](http://www.oasisdesign.net/greywater)

**Home Energy Saver:** Interactive site to help you identify & calculate energy savings opportunities in your home. A lot of great information! - [hes.lbl.gov](http://hes.lbl.gov)

**Home Power Magazine:** [www.homepower.com](http://www.homepower.com)

**IREC/ Interstate Renewable Energy Council:** RE educational info. [www.irecusa.org](http://www.irecusa.org)

**NABCEP/ North American Board of Certified Energy Practitioners:** This organization that tests & certifies PV system installers. Individuals are Certified, companies are not. [www.nabcep.org](http://www.nabcep.org)

**NESEA/ Northeast Sustainable Energy Assoc.:** [www.nesea.org](http://www.nesea.org)

**National Association of Energy Service Co. (NAESCO):** [www.naesco.org](http://www.naesco.org)

**National Renewable Energy Laboratory (NREL):** [www.nrel.gov](http://www.nrel.gov)

**National Solar Institute:** [www.nationalsolarinstitute.com](http://www.nationalsolarinstitute.com)

**NeighborWorks® Alliance of Vermont:** Low-cost energy loans - [www.vthomeownership.org](http://www.vthomeownership.org)

**New Hampshire Sustainable Energy Assoc. NHSEA** Focused on N.E. US, for consumers & industry- RE & clean building info, events. [www.nhsea.org](http://www.nhsea.org)

**New York Solar Energy Industries Association/NYSEIA** [www.nyseia.org](http://www.nyseia.org)

**NFRC** independent rating & labeling system for the windows, doors, skylights [www.nfrc.org/](http://www.nfrc.org/)

**NH Office of Energy and Planning:** [www.nh.gov/oep/programs/energy/RenewableEnergyIncentives.htm](http://www.nh.gov/oep/programs/energy/RenewableEnergyIncentives.htm)

**Renewable Energy World:** [www.renewableenergyworld.com](http://www.renewableenergyworld.com)

**Renewable Energy Vermont:** [www.revermont.org](http://www.revermont.org)

**SEIA/ Solar Energy Industries Association:** The SEIA Tax Manual to answer your solar related tax questions. [www.seia.org](http://www.seia.org)

**SmartPower:** [www.smartpower.org](http://www.smartpower.org)

**Solar Components:** [www.solar-components.com](http://www.solar-components.com)

**Solar Living Source Book:** [realgoods.com/solar-living-sourcebook](http://realgoods.com/solar-living-sourcebook)

**Solar Power Rocks:** Impressive data and info ,including per state. [www.solarpowerrocks.com/](http://www.solarpowerrocks.com/)

**Solar Store of Greenfield, MA** Stock & install a wide variety of solar & environmentally friendly technologies. [SolarStoreofGreenfield.com](http://SolarStoreofGreenfield.com)

**Tax Incentives Assistance Project (TIAP):** [www.energytaxincentives.org](http://www.energytaxincentives.org)

**The Energy Grid:** [www.pvwatts.org](http://www.pvwatts.org)

**The Office of Energy Efficiency & Renewable Energy (EERE):** develops & deploys efficient & clean energy technologies that meet our nation's energy needs - [www.eere.energy.gov](http://www.eere.energy.gov)

**Track the Stimulus Money:** [www.recovery.gov/Pages/home.aspx](http://www.recovery.gov/Pages/home.aspx)

**Vermont Energy and Climate Action Network (VECAN):** works to start and support town energy committees as a powerful, people-powered response to realizing a clean energy future. [www.vecan.net](http://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](http://groups.google.com/group/vt-tar-sands-action)

**VPIRG:** understand the clean energy resources available to VT - [www.vpirg.org/cleanenergyguide](http://www.vpirg.org/cleanenergyguide)

**VT Energy Investment Corporation (VEIC):** nonprofit organization that issues home energy ratings for new & existing homes. 800-639-6069 - [www.veic.org](http://www.veic.org)

**Weatherization, Energy Star & Refrigerator Guide:** [www.waptac.org](http://www.waptac.org)

**www.susdesign.com/tools.php** Online info for solar benefit with house design. i.e. window overhangs, sun angle & path...

## BUSINESS LISTINGS

### PIKA ENERGY

Contact: Chip Means at (207) 887-9105.  
35 Bradley Drive #1, Portland, Maine.  
*Pika Energy's products capture and manage clean power, from home wind turbines to microgrid electronics.*  
Email: [sales@pika-energy.com](mailto:sales@pika-energy.com)  
<http://www.pika-energy.com>

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### ADVERTISE IN GREEN ENERGY TIMES

Call in your ad info or e-mail ad copy to: [INFOGREENENERGYTIMES.ORG](mailto:INFOGREENENERGYTIMES.ORG). Deadline for Dec. 15th Issue: Nov. 30th. Up to 50 words: \$25. Each additn'l word 65¢. Call for more info: 802.439.6675.

### AD SALES POSITIONS FOR G.E.T.

Sales Positions for VT, NH & MA. Experience preferred. Must be serious, self-disciplined and familiar with Green Energy Times - passionate about solutions for the planet is a bonus. Must have good communication skills. Work from home - for the sake of the planet. **Serious inquires only.** Send cover letter and resume to [info@greenenergytimes.org](mailto:info@greenenergytimes.org).

### PERMACULTURE

Design Course with Sowing Solutions at Sirius EcoVillage near Amherst MA~ July 17th - 30th in 2015. Learn about edible landscapes, community resilience, water harvesting, energy efficiency, natural building, and ecological design practices for your own home. Attend this inspirational summer training & certification course! (College credits are available/optional) [www.PermacultureSeries.org](http://www.PermacultureSeries.org)

### VERMONT INSULATED CONCRETE FORMS

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## VT's Statewide Solar Tours

cont'd on p. 15

an opportunity to work together to re-power Vermont through shared, group solar arrays, like the one in my backyard," said Evergreen Erb of Jericho.

The grassroots event is supported by Renewable Energy Vermont, with new sites being added throughout June.

About Celebrate Solar Tours - June 20. The first annual Celebrate Solar Tours on June 20 will feature public tours of more than 40 solar systems of varying size throughout the state. The public will have the opportunity to get an up-close understanding of the technology, economics and benefits to the community. Open systems will be designated with roadway signage and many will feature refreshments, music, or other entertainment.

Contact: *Ansley Bloomer, Renewable Energy Vermont, 802-595-0723* [Ansley@revermont.org](mailto:Ansley@revermont.org)

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# Ingredient of the Month

By Larry Pleasant

## ELECTRONIC CRACK

We've all heard comments that smartphones, which moving forward we will refer to as rectangles, being "electronic crack." Well the scientific data is coming in, and it turns out that the electronic crack remark is spot-on. Here's why:

You know how good and self-satisfied you feel after completing a task like cleaning your house or organizing your desk? That is because our brains have a built in reward mechanism that gives us a shot of dopamine, (as in "why do you think they call it dopamine?"), when we accomplish something. It's kind of like getting a treat for being a good girl or boy.

Well, it turns out this reward mechanism is actually quite stupid. It gives out that shot of dopamine whenever YOU feel like you accomplished a task. This applies not only big things like discovering a new non-polluting energy source, but really little dumb-ass little things like deleting spam or forwarding a Facebook post about a cat that can dance on its hind legs (as one example).

Yes, it's true. We get rewards from making simple, silly little decisions like deleting, forwarding or otherwise dealing with words on your rectangle, because they involve making ANY type of decision. They can and most likely will trigger the dopamine reward mechanism.

So there it is. Playing with your rectangle is the brain's equivalent of smoking crack cocaine. This is literally true, since cocaine works by blocking one of the dopamine feedback receptors, allowing your brain dopamine

levels to quickly build up beyond normal parameters. It doesn't matter if your delivery system is a glass crack pipe or a 6-inch plastic rectangle. The results are exactly the same, though the dosage is smaller.



Yippieeee. Photo by Matthias Zirngibl from Germany. Creative Commons Attribution 2.0 Generic license.

To learn more about the numerous ways that smartphones are making us addicted and stupid, check out the work of neuroscientist David J. Levitin and The Guardian Newspaper online.

This is the Soapman, saying, "Don't be a dopamine head. Stay off the electronic crack."

Larry Pleasant is a writer, philosopher, part-time farmer and soap maker living and working in the Green Mountains of Vermont. More at [vermontsoap.com](http://vermontsoap.com).

## Off-Grid in the City

cont'd on p. 14

off-grid homeowner's use is the flooded lead-acid battery. With daily cycling a lead-acid battery will need to be replaced about every five years. Over a 30-year period, this battery replacement can add up to be very expensive. Further, when the lead-acid batteries are removed, most are shipped to Mexico or overseas for recycling. Most of these lead-acid recycling plants are dirty and unregulated.

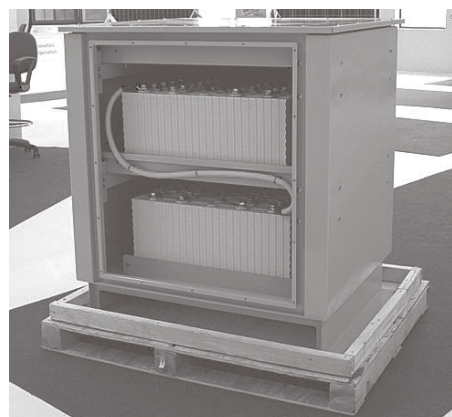
Another battery option gaining popularity in off-grid applications is the nickel-iron battery, which has a 30-year life and is environmentally friendly. Developed by Thomas Edison over 100 years ago, the nickel-iron battery is freeze-resistant and can be fully discharged without damaging the cells. Just like lead-acid batteries, nickel-iron batteries require distilled water refills, but no other battery on the market today will last as long.

For the homeowner who is not interested in battery maintenance, a lithium iron battery is a great fit. A lithium iron battery is maintenance-free and will last 14 years being cycled daily. For comparison, a sealed lead-acid battery will last about four years, so this allows the homeowner

to go for a much longer period of time without needing to replace the battery.

Being off-grid in the city is now a reality. It is time to gain energy independence by breaking away from the utility by generating power with a home solar and battery system.

Maggie Williams is the co-founder of Iron Edison Battery Company



Iron Edison 48V 700Ah 36kWh Lithium Battery for Solar. Photo courtesy of Iron Edison.

## Is 2015 the 'Year of the Ticks'? Reasons & Repellents

By Green Energy Times Staff

We should not let tiny biting creatures keep us from enjoying summer. Nevertheless, with the high tick population in the northeast and the diseases they can also carry moving into the area, it is more important than ever to protect ourselves and our pets against the diseases that ticks carry.

Most of us have at least heard of Lyme disease. It is not terribly difficult to treat, if it is attended to quickly enough, but it seems most people miss noticing it until it is too late. The infamous bull's-eye rash is not always present, and mild symptoms are often dismissed. It can have flu-like symptoms, nausea, and headache, but in time can produce serious joint pain and chronic fatigue. It is best to see your physician when problems come up.

Unfortunately Lyme disease is not the worst tick-borne illness. The same ticks carry a new threat called Powassan disease, which can cause serious problems within hours, and can be fatal.

We should not indulge in assumptions about ticks. They can be anywhere, even in cities. Researchers at one built-up place near Philadelphia found that ticks were nearly as common as in the deep woods, with large numbers carrying Lyme disease. Also, cold winters do not always kill them off. A thick blanket of snow can insulate them from winter's coldest air.

The Center for Disease Control and Prevention recommends daily tick checks after being outdoors, even in your own yard. It also suggests using repellents and showering soon after being outdoors. If you find a tick, you should not burn it, squeeze it, or cover it with lotion. Instead remove it gently with tweezers or a tick remover, prying on it until it backs out. Do not burn the tick to kill it. Instead store it so it can be checked if you develop symptoms. You can put it into a jar with alcohol in it and a date on the lid. You should, of course, call a doctor if you get a fever or rash.

We can reduce the likelihood of having a problem with ticks in advance, by using repellents. Consumer Reports has had an excellent article, covering a number of options for bug bites, including natural, milder herbal chemicals. Their tests included the length of time they work and effectiveness of the ingredients. You can watch a video at [bit.ly/consumer-reports-on-bug-repellents](http://bit.ly/consumer-reports-on-bug-repellents).



Dog tick. Photo by Gary Alpert, GNU Free Documentation License. Wikimedia Commons

Among the repellents tested, the one that was best seems to have been Fisherman's Formula, which uses Picaridin. The Sawyer Picaridin Insect Repellent has effects similar to those of DEET, but will not easily harm gear or equipment. It repels mosquitoes and ticks, and also keeps many other biting insects away. These include stable flies, black flies, gnats, chiggers, and sand flies. The topical repellent is effective for up to 14 hours. A spray is also available, which is effective for up to 12 hours against mosquitoes and ticks, and about eight hours against biting flies. It is available online at places like backcountry.com, Cabela's, and Camphor. You might find it at stores in much of the Northeast, such as REI, Dicks Sporting Goods, Eastern Mountain Sports, and REI. You can check at <https://sawyer.com/where-to-buy/>.

Repel is another repellent, and it is based on oil of lemon eucalyptus. It is plant-based and derived from oil obtained from the leaves of the Eucalyptus citriodora tree. Repel Lemon Eucalyptus gives you up to 6 hours of protection. It should be good for about six hours, at which point it can be reapplied. It is not recommended to be applied more than twice per day, however. It is available at many stores; we have been told it can be found at Walgreen's.

Insect repellents are not without side effects. They should be used sparingly, especially on young children and the elderly. They should only be used when needed. And please, read the label for use and safety.

## Permaculture Principles

cont'd from p.31

am not just weeding but harvesting something medicinal or culinary. I gather the feedback that we have created a surplus and designed well for abundance!

I also experience value feedback hearing what students do a few months, or perhaps years, after graduating the course. We hear of a CSA farm featuring perennial crops in Hudson; an urban bee habitat project in LA; a straw-bale home in Saratoga; a thriving university dining services garden in Amherst; an edible, therapeutic garden for city schools in New Bedford; a woman constructing her own tiny house in Ithaca. Their stories are about how integrating numerous permaculture principles in their work enhanced their success.

In permaculture we strive to go beyond sustainability (which can be described as meeting needs of the present without compromising needs of the future). We focus on replenishing and yielding a surplus to create conditions for a possible 'state of sustainability'. That state calls for great cultural shifts, relearning of practical and ecological life skills, and many other skills addressed in our design course. Designing this learning environment with permaculture principles in mind ensures that the educational experience is alive, diverse, and thriving.

Websites are [www.PermacultureSeries.org](http://www.PermacultureSeries.org) and [www.SowingSolutions.org](http://www.SowingSolutions.org).

Kay Cafasso is an ecological designer, permaculture educator, and Director of Sowing Solutions Permaculture Design & Education, based in Greenfield, MA.



# "Was' SUP?" STAND-UP PADDLING ... THAT'S WHAT

By Roger Lohr



**Stand-up paddling (SUP)** is now the newest contagious water chic. Statistics for stand-up paddling, which is among the fastest growing forms of recreation, is 70% male and a median age

of 37. There were 150,000 paddleboards sold in 2011 (double the number sold the previous year) and according to the Outdoor Industry Association there were 1.2 million people, who paddled on a stand-up paddleboard in 2011.

So what's SUP about? It appears that people are doing it wherever there's water – on ponds and lakes, on rivers, and surfing waves on the shoreline. I'm thinking that destinations such as Lake Tahoe in CA/NV or Winnepesaukee in NH would be a vista-strewn experience on a paddleboard, but really, any water will do.

It looks like the easiest way to start stand-up paddling is to rent a board, find some calm water to help build confidence balancing on the board, and go with an existing paddle-boarder to get the sport's nuances (including spiritual). It appears to

be as easy as snowshoeing is on the snow – the paddleboard is about 10 to 12 feet long covered with a nonslip deck pad.

As you might imagine there are different paddleboard genres such as touring, racing, surfing, performance or relaxation, for women, for yoga, and river fun. Select a paddleboard by how much you weigh, where you want to go, and how much experience you have as a surfer or windsurfer. You can buy paddleboard packages with the board, paddle and other accessories and as a combination.

Length is the key issue with regard to the paddle. A longer paddle provides a stronger stroke and a shorter paddle can offer a quicker cadence. But a sore back and shoulders are the price to pay with the wrong size paddle. It's probably a good idea to try out different paddles because there are a variety of selection choices such as blade width, material type, handle type and whether it is one piece, adjustable, or able to be broken down into smaller pieces so it's easier to take on a trip. Recommendations on the SUPConnection.com website: to get the right size paddle place the end of the paddle on the ground and raise your arm above your head while flattening your hand so the paddle tucks into your palm. Racers should reach as high as possible with the arm to get a longer paddle.

Other gear issues include paddleboard fins that are available to be installed singly or as a set to allow better maneuverability



Steve Brownlee (left), Sage and Tyler Brownlee (below right), paddling on Lake Dunmore Salisbury, Vermont. Far left and below: Fun on paddleboards at Waterbury Reservoir, Vermont. Photos by Emma Brownlee



or more speed. A leash will keep you connected to the board and a flotation device can save your life in difficult situations. There's also "SUP etiquette" to keep peace and get along with other paddle-boarders particularly when surfing waves and of course, it makes sense that stand-up paddlers be good swimmers.

Prices? New paddleboards start at about \$800 and can go to \$2,000 while paddles range at \$80-400. Paddleboard packages are sold with the accessories ranging from \$800 to 1,500. So get on out there on a paddleboard.

Roger Lohr is the founder and editor of XC Ski Resorts dot com. He is also a prolific national writer on sports. Read more at XCSkiResorts.com.

## 'Solar Sal'

### A Solar-powered sailboat Retrofit

By Joanne Coons

Solar Sal, a 40-ft solar-powered boat, is a great example of a project that had the participation of a broader community. In this case there was not only a dedicated group of friends and helpers, but also help from an unlikely-sounding place, a school system. A lifelong commitment to utilizing solar photovoltaics to power our needs drove David Borton to bring water transportation to a new level.

David had built several more modest solar-powered boats, including his twenty-foot boat, Sol. A dream of larger craft turned into reality as Sol scaled up to forty feet. David shared his imaginative ideas with like-minded people who saw the need to make boats more sustainable. (Good-bye dirty fossil fuel polluting our air and water.) Water transportation

powered by the sun makes perfect sense because it's all about reduced friction and unlimited full sun out on the water. A sleek hull design lets a boat cut through water like a hot knife through butter. Buoyancy counteracts gravity.

Years ago, America's growth to the west from Albany, NY was an ambitious dream that turned into reality based on waterways. A geological pass through the hills of upstate New York provided the right site for a hand dug, design-as-you

go canal. The Erie Canal provided efficient water transportation to Buffalo in three days rather than cumbersome wagon ride that could take weeks. I hope you see the parallel evolution here: from wagon and horse to canal boat and horse, then to diesel boats and interstate trucking, and now to solar-powered car and solar-powered boat.

There are many reasons David's dream has become a reality. Many people supported his imaginative idea. Support can come in the form of a place to build. Bob Horan, superintendent of Schodack Schools, arranged for the school district to support building of this boat by providing a bay in their bus garage, and that is where Solar Sal was built.

The school system's help paid off in education. The art, history, science, technology, building skills, and design skills were integrated into school curricula with students and faculty interaction. Imagine the pride that a youngster gets to participate first hand, and then sees this collaborative effort evolve to be a functioning boat that navigates on the Hudson and Mohawk rivers. This can-do attitude teaches students how all things are possible and not to give up, but to *cont'd on p.38*



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# Eating to Cool Off

By Linda Prout



Yin foods cool us off and yang foods heat us up, according to Traditional Chinese Medicine (TCM). This is good to know when temperatures reach triple digits or you are uncomfortably hot. It's also helpful in winter when you can't seem to warm up.

Yin foods, according to TCM, are moistening and cooling. This has little to do with the moisture content of the or how cool a food is to the touch. In fact, ice cream and icy martini are both heating. In other words they can heat you up.

Yin foods are able to cool your body core, irrespective of temperature. Examples are found in summer favorites: watermelon, cucumbers, salads, tomatoes, eggplant and summer squash. Many leafy greens are cooling, especially spinach. Crab, clams and mung beans are quite cooling.

I was fascinated to see a prominent hospital in Beijing keep patients cool in summer not by turning on the AC, but by feeding them mung beans and green vegetables.

Red meat, especially lamb, is warming. Add warming spices such as garlic, ginger, cardamom and you have a recipe for generating big time heat. Save these foods for winter.

Moist seafood tends to be neutral or cooling and duck is neutral but moistening so good choices for summer. Bean dishes such as white bean salads or hummus are good protein choices and thus taste particularly good on hot days.

Anything raw, including salads or sushi, is more cooling than cooked fish or vegetables. Most raw fruits are cooling and moistening, although a few, including cherries are warming.

Alcohol is hot, plain and simple. A frosty margarita may taste good going down, but that tequila will heat your very core. Same goes for beer and wine, although white wine is less heating than red. The headaches many suffer after drinking red wine are linked to its heating nature. Heat rises and headaches can be the result.

Strangely hot spicy foods, while initially feel heating and likely to cause a sweat, are ultimately cooling. Perspiration and dilated capillaries cool the body, eventually.

Cold drinks and frozen desserts may feel cooling at first, but they cause the body to generate heat. People living in hot climates know warm soups and teas are more cooling than icy drinks and cold foods.

Linda Prout is the author of 'Live in the Balance, the Ground-Breaking East-West Nutrition Program.' She developed the nutrition program at the Claremont (CA.) Resort and Spa in Berkeley as well as the detox program for the Six Senses Spa in Turkey, and much more. Learn more about nutrition, yin-yang balance, and much more at: [lindaprout.com](http://lindaprout.com).

# SUMMER FUN FROM THE SUN SOLAR-POWERED STAGE

By N.R. Mallery



The Jim Mitchell Community Park, in Warner, New Hampshire, opened to the public on October 10, 2010, through the efforts of the non-profit MainStreet Warner, Inc. This Park was inspired and initiated by Jim Mitchell and his legacy to give back to a town he so loved. Mitchell, who died unexpectedly in 2008, was the brother of Katharine (Mitchell) Nevins, and who along with her husband, Neil, opened the solar-powered bookstore, MainStreet BookEnds in 1998. Together they co-founded MainStreet Warner, Inc. in 2000. The MainStreet Warner Stage is located in the amphitheater of the park, and is adjacent to MainStreet BookEnds.

Nevins said her brother became an ambassador for Warner, and coined the phrase, "Something wonderful is happening in Warner." Those words are inscribed on the ground in the park and in the hearts of this community.

A 13th-century post-and-beam barn design, the stage was designed and built by the community - by local carpenters, volunteers, and with funds raised from the community, as well. It is run on four solar panels, installed by Harmony Energy Works of Hampton, New Hampshire. The park is irrigated by a stored rainwater system installed by Greenleaf Irrigation, and

includes an "edible landscape" garden. The stage officially opened in October, 2013.

While the events scheduled for the 2015 season started on May 23, there is a summer full of fun that is powered from the sun, scheduled for 2015. Here is

what they have lined up as of this printing.

- June 19 6-9 pm. **Jake Davis and the Whiskey Stones** is a string band playing soul-filled American music. Seacoast, NH. <http://jdavismusic.com/>.

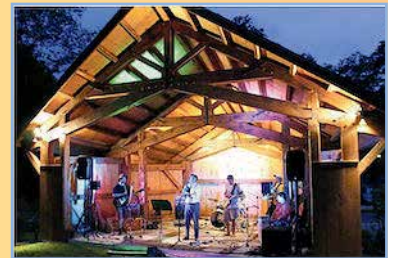
- June 26 6-9 pm. **The Tenderbellies** blend Americana, bluegrass, new grass, jazz and rock. Burlingtonbased string band. <https://soundcloud.com/tenderbellies-bluegrass>.

- July 7 5:30-8pm. **Etna Old Time Association** is a new-old-time duo rooted in Etna, NH. Traditional and newer tunes of bluegrass and folk. <http://etnaoldtime.com/> <http://etnaoldtime.com/#/#video>.

- July 10 6-9pm. **Beechwood** is an acoustic duo/trio, playing a mix of originals and covers blend of Old Folk, Bluegrass, Country, Rock, Blues. <http://beechwood-acoustic.wix.com/beechwood>
- July 14 5:30-8pm. **"BEAT FEST"** drumming event. You are invited to bring your own drums and rhythm instruments. <http://kathyloremusic.com>.

- July 17 6-9pm. **Pat & the Hats** is an original award-winning, modern rock band from Central NH. <http://www.patandthehats.com/>

- July 18 5:30-9pm. **DIG - fest.** The



**DoBros.** Ranging from jazz and soul to funk and psychedelic rock. "Soulfunk rage-jazz". <https://www.facebook.com/dig.grooves?fref=photo>

- July 28 5:30-8pm. **Tim Fischer & Brad Myrick.** <http://timfischermusic.com/>
- July 31 6-9pm. **Questionable Company.** A folk-funk trio from Burlington, Vt. <http://www.questionablecompany.com/>
- August 10 6-9pm. **Beechwood.**
- August 15 4-10pm **MainStreet Warner Film Festival.** <https://filmfreeway.com/festival/MainStreetWarnerFilmFest>
- August 18 5:30-8pm. **Tom Pirozzoli's** music is rooted in a broad tradition that uniquely combines jazz, classical and pop for a truly original sound. <http://pirozzoli.com/>.

- August 21 **Bradford Bog People.** Fiddle, banjo, guitar... <http://www.bradfordbogpeople.com/>

Additional events as they are confirmed or changed can be found at [www.mainstreetwarnerinc.org](http://www.mainstreetwarnerinc.org) and through the bookstore website at [www.mainstreet-bookends.com/park-stage-events](http://www.mainstreet-bookends.com/park-stage-events).

Something wonderful is happening in Warner!



Top left two pics were taken in August, 2014 by N.R. Mallery. Top & bottom right pics: The stage in 2015. Photos courtesy of Katherine Nevins, Main Street Bookends, Warner, NH.



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# Round-up Troubles

By George Harvey

Here is yet another example of a potentially dangerous product that has been widely unleashed on the unwitting public and the environment before it has been proven harmless.

In late March we got word that the World Health Organization (WHO) has classified glyphosate as a "probable carcinogen." Glyphosate is the chemical name for the Monsanto product Round-up, which is the most commonly used weed-killer in the world. It is often used in conjunction with genetically modified (GM) crops, specifically engineered to be immune to its effects.

This is hardly a surprise to some. Longtime readers of Green Energy Times and visitors to our website may remember that we posted a press release on Roundup in 2012. That article reported a peer-reviewed paper in the journal Food and Chemical Toxicology, which said quite a lot damning the product.

Among other things, that article said, "Researchers found that rats fed on a diet containing NK603 Roundup-tolerant GM maize, or given water containing Round-up at levels permitted in drinking water and GM crops in the US, died earlier than rats fed on a standard diet. They suffered mammary tumors and severe liver and kidney damage." The entire article can be seen at [bit.ly/GET-Roundup-2009](http://bit.ly/GET-Roundup-2009).

Environmentalists had this product in their sights long before that, and for a simple reason: it is a killer. Its purpose is to kill any of a broad spectrum of living organisms that are exposed to it. Many of these are bacteria, but they also include a range of plants from grasses to shrubs and trees. If this reminds you of Agent Orange, it is probably for good reason.

Researchers working on glyphosate noticed a number of things about it that made them think it had value. One is that it had relatively little effect on most animals they tested. Another is that there were a number of plants that were naturally resistant to it, which made them hope that it would be possible to genetically engineer DNA of seeds of other species so they would be resistant to it as well. They achieved that, and Monsanto marketed the GM seeds as "Roundup Ready." [sic]

A simple example of why it is a problem is that it destroys milkweed effectively and is causing the species to decline. As milkweeds decline, so do

those other organisms dependent on them, including the monarch butterfly. It is a pattern repeated over and over, with many species of plants and the animals that depend on them.

We have no way to understand exactly how extensive the problems with Round-up are. Nevertheless, since glyphosate is the most commonly used weed killer, it is a big problem.

Over the years since it was introduced, the weeds it is used to kill have gradually produced resistant strains naturally. This has come to the point that the product has declining value as a weed killer. At the same time, as more of it is applied, it does more environmental damage to unintended victims.

The news that the WHO has classified glyphosate as a probable carcinogen, based on its own research, makes us believe farmers should not use it, and citizens should use neither it nor the genetically modified products raised with it. Monsanto takes the position that the WHO's research is flawed. Roundup represents about 10% of the company's roughly \$15 billion gross revenues.

## WEED-BE-GONE RECIPE

It will kill anything you spray it on.

### Ingredients

- 1 Gallon Vinegar
- 2 Cups Epson Salt
- 1/4 Cup Dish Soap

### Preparation

- Just mix and spray in the morning, after the dew has evaporated. Walk away. Go back after dinner and the weeds are all gone!

Cheaper than anything you can buy anywhere! **Never buy Round-up again**



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## 'Solar Sal' cont'd from p.36

work on solving the problem until you find the solution.

Community members also volunteered time and talent daily with long hours. The Southern Saratoga Chamber of Commerce saw the potential for this viable form of transportation to move goods and people and develop economic growth. Special local lumber was ordered. Manufacturers of products that were used saw new applications of their products including solar panels, batteries, hull coatings and electric motors.

In the end, time, energy, talent and perseverance have taught the Schodack, NY community a lesson that cannot be found in a text book. Seeds of imaginative thought were planted in the minds of



each student, community member, and teacher who participated. All the good lessons learned will grow in each one of these individuals, so they can turn their own dreams into reality, making a better, more sustainable world.

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# Flowers You Can Eat

By Jessica Barber Goldblatt

A sprinkling of colorful flower petals in a salad, a tiny bouquet of Johnny jump-ups on a birthday cake or a sautéed daylily bud in a stir fry. Edible flowers are a fun and easy way to add color and flavor to all sorts of dishes — especially when you can pick them right from your own yard. You can grow edible flowers in large pots, a dug garden bed, raised bed or raised wooden box filled with organic soil... Mix organic compost, dirt, manure, rock phosphate, green sand all of which can be bought at local feed or garden stores. Just watch that no chemical fertilizers are used.

Most edible flowers are best eaten raw—simply pick and rinse with water. Flowers will taste and look their best right after they have opened, rather than after they have been open for a few days.

There are only two important things to remember about edible flowers: First is that not every flower is edible. In fact, some flowers can be poisonous. So stick with flowers on the list below, or do sufficient research to ensure your safety. The second caution is to avoid flowers that may have been sprayed with an insecticide, fungicide or herbicide. Most edible flowers—except for roses—are easy to grow.

\* **Alliums.** Chives, leeks and garlic are all delicious in green salads, potato and pasta salads and dips. Remove the central stem from the flower cluster to release the separate florets.

\* **Nasturtiums.** Blossoms have a peppery flavor like watercress. All colors and varieties are tasty in salads or as garnishes. Leaves can be eaten, too.

\* **Marigolds.** Use the tiny flowers of signet marigolds, such as Lemon Gem and Tangerine Gem. Their blossoms have a citrus taste.

\* **Pansies and Johnny jump-ups.** These flowers have a wintergreen flavor and are pretty on cakes and other desserts. Glaze with warmed jelly for a jeweled look.

\* **Calendula.** An easy and prolific edible flower that's easy to grow from seed right in the garden. Separate the petals from the center of the flower and sprinkle the petals into salads. Colors range from pure yellow to orange and red. Remove spent flowers and the plants will bloom continuously from early summer into late fall.

\* **Anise hyssop.** If you like anise, this is the edible flower for you. Separate the florets and add them to sweet or savory dishes. Or use the full flowers to garnish a cheese plate.

\* **Honeysuckle.** The blossoms make a pretty addition to salads. Don't use the berries; they're poisonous.

\* **Scarlet runner beans.** Mix these bright-red flowers into salads, or in with steamed veggies.

\* **Borage.** This fuzzy-leaved herb has sky-blue flowers with a light cucumber taste. Add to fruit salads, green salads or freeze in ice cubes for cold drinks.

\* **Bee balm.** This member of the mint family has minty-tasting flowers. Colors range from bright red to purple and pink.

\* **Chamomile.** English chamomile has small, daisy-like flowers with an apple-like flavor. If you're allergic to ragweed, you might want to avoid chamomile.

\* **Daylily.** Daylily buds and flowers taste a bit like asparagus. They can be used as a garnish, or can be stuffed or made into fritters. Good in stir-fries, too.

\* **Mint.** Like bee balm, all flowers of the mint family are edible and have a pleasant taste. Try lemon balm or spearmint in iced tea.

\* **Squash blossoms.** Use these as you would daylilies (see above).

Jessica Barber Goldblatt is the owner of Interiors Green -- the Home and Living Store at 201 Main Street in Bethlehem, NH. [www.interiorsgreen.com](http://www.interiorsgreen.com).



A salad of cooked vegetables with flowers. Photo by Yelkrokoyade. GNU Free Documentation License Wikimedia Commons.

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## WARNING! Tainted Plants at Many Retail Garden Centers!

Staff Article

In April 2015, we heard some good news from the Toxic Action Center: that Lowe's has finally committed to get rid of bee-killing pesticides!

The results from a strong network of allies working on this campaign mean that Lowe's has made the most significant



Neonics, that are found in many plants being sold in commercial retail markets, can kill our bees. Bees are important pollinators! Photo: [http://farm9.static.flickr.com/8506/8475706265\\_849d8269a5\\_m.jpg](http://farm9.static.flickr.com/8506/8475706265_849d8269a5_m.jpg)

public commitment so far for a retailer of its size. It has joined a growing number of retailers that are taking action on neonics, including Home Depot and BJ's Wholesale Club, but it has gone further by setting a firm date to stop selling plants raised with them.

So what does this mean? Lowe's will **phase out neonics** and plants pre-treated with them **by the spring of 2019**. It is also working with suppliers to minimize pesticide use overall and move to safer alternatives. Please note that this means that the products being sold until 2019 will still be tainted and can kill our important pollinators!

While Lowe's progress is encouraging, we have a ways to go to assure the future of bees and the necessary pollination they provide to us. The next-largest garden retailers, True Value and Ace, have yet to make any similar commitments on bee-killing pesticides. We hope that they will soon also commit to the same so that everyone can plant bee-friendly gardens!

Please think about the bees when shopping for plants. If we make smarter choices by buying from locally-sourced and especially organic nurseries, we'll get bee-toxic pesticides off the shelves, out of our backyards, and out of our communities. It's our future. We need to eat. We need the bees!

Contacts: Toxic Action Center: [www.toxicsaction.org](http://www.toxicsaction.org)

Montpelier, VT: (802) 223-4099; Amherst, MA: (413) 253-4458; Concord, NH: (603) 229-1331; Sylvia Broude - Executive Director (617) 747-4407 [sylvia@toxicsaction.org](mailto:sylvia@toxicsaction.org).

Read about the toxicity of Neonicotinoids at <http://en.wikipedia.org/wiki/Neonicotinoid>



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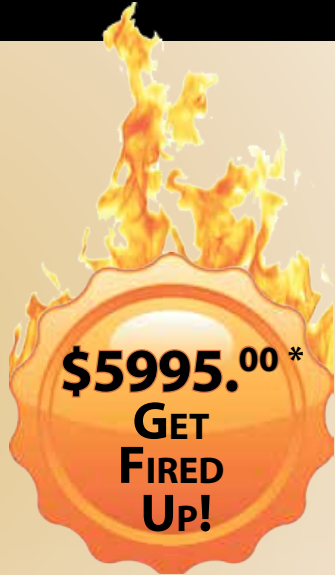




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