Volume 3

SUSTAINABLE HANOVER
ENERGY | ENVIRONMENT | COMMUNITY

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Hanover's Grasse Road Solar Farm

Town of Hanover - Closing in on 100% Renewable Energy

Robert Taylor and April Salas

Hanover residents in May 2017 endorsed a vision for achieving 100% renewable electricity by 2030, and heating and transportation by 2050. Town Manager Julia Griffin kept saying the town had to "walk the talk." The town is doing just that!

On December 28, 2020, Hanover flipped a switch on a solar array next to the water treatment plant and more than tripled its home-grown solar electricity production. And next summer, the total will more than double again. The result: the town will be providing about 92 percent of the electricity demands of its buildings and facilities with renewable energy generated right here in Hanover.

"This success is the culmination of years of hard work by Hanover's dedicated community volunteers – the Sustainable Hanover Committee – and Town Staff in Planning and Zoning, and Public Works," says April Salas, Hanover's inaugural Sustainability Director. "And we are very proud to lead the way," she adds. Residents saw the town's first solar panels go up on the south facing roof of the Police Department back in 2015. Four years later, panels are installed on the roofs of the Town Hall, Equipment Storage Building, the Salt Storage Building of the Public Works Department and on the Water Reclamation Facility. But the cumulative generating capacity of these added up to less than 300 kW DC, less than 15% percent of the town's power consumption. The town had a long way to go.

Help was on the way. Diligently, town staff and advisors had been working on a major advance. Using an agreement to purchase the power from an investor, the town had 1,872 solar panels erected on the grounds of the Grasse Roads Water Treatment Facility. When they were activated last December, they brought the town's solar power up to almost half of the energy needed to run the town's buildings and facilities, needs that had been boosted by the installation of heat pumps to heat and cool many of the town buildings instead of fossil fuel boilers. A second, even bigger phase of that Grasse Road solar farm is due to be completed this summer. When that goes on line, the town's solar panels are expected to power almost all of its energy needs.

The Grasse Road project is a well-kept secret for much of the town's people. It stands on a little-used road out of sight of state route 10. The town has lots of other hurdles to clear before it meets its "ready for 100" goals. But the Grasse Road project is a big leap forward.

Julia Griffin notes "Sustainable Hanover volunteers, the Selectboard and Town staff have been dogged in their determination to take the lead

by showing the way. We have been joined by nearly 200 homeowners who have also installed solar or purchased panels in a NH community solar installation and Dartmouth College has also installed solar aggressively. This community is determined to make progress on the renewable energy front."

Charlestown Solar Array

Community Solar - My Best Option

Judi Colla

My ears perked up when Kevin Davis of Norwich Solar Technologies approached Sustainable Hanover last spring with news of their 100 kW community solar project in Charlestown, NH. My husband, Stan, and I have long considered going solar, but our wooded property on the uphill side of Rip Road has limited sun exposure. We would have had to cut down trees that we love and install a larger number of solar panels to compensate for our location on the west side of Balch Hill, both impacting costs. In addition, we have concerns about our aging flat roof.

Joining others in purchasing panels of a large array always seemed like a better option for us, but, until now, not viable. Group net metering has been available in New Hampshire for a few years, but it has issues. A recent PUC ruling overcame one of those barriers by allowing participants in a larger array to receive credits directly on their electric bills.

We decided to explore this option and sent Kevin a deposit to secure a spot. In order to estimate how many solar panels we would need to purchase, we also sent a spreadsheet summarizing our monthly electrical consumption for one year.

As a member of Sustainable Hanover and co-chair of its energy initiative, I am constantly inspired and informed by my colleagues. Having learned that it is important to "walk the talk," my husband and I are finally ready to implement some of our own plans. We will be increasing the efficiency of our mid-century home. We also want to meet our space heating needs as much as possible with heat pumps and replace at least one of our gasoline-powered cars with an electric vehicle (EV). Kevin estimated our imminent future needs for one additional heat pump and an EV. This brought our current and anticipated electrical needs to 14,300 kWh per year.

Based on our anticipated needs, we purchased 32 panels. Kevin quoted a gross price, then calculated our 26% federal tax credit and net price. He told us what Liberty Utilities (LU) would be crediting us for every kWh our panels generated and how this would increase over time. He also explained that some of this credit would go the Charlestown Community Solar, LLC (CCS) to cover management fees -- 10% if we sold our renewable energy credits (RECs) to LU or 25%, if we did not. From this information, we were able to estimate our return on our investment for both scenarios – 14 to 15 years, if we sell our RECs, and 16 to 17 years, if we do not. These estimates will, of course, vary from project to project.

My husband and I are retired. We considered whether or not it made sense for us to invest in something with a minimum payback of 14 years. My father passed away just four days shy of his 99th birthday, and my family is making plans to celebrate my mother's 100th birthday this coming August. In addition to the possibility of at least one of us having a long life, our home is a good option for aging in place. It is essentially all on one level with only one step up from our attached garage. Should things not go as planned, however, we can sell our share in CCS to anyone else serviced by LU, most likely the folks who purchase our home. Alternatively, we can transfer our monthly credits to another LU account whether it be our own in a new location or that of a family member, friend, or non-profit.

In the meantime, we feel good about investing in the future of generations to come. We are grateful to Kevin and Norwich Solar Technologies for their courage in creating their first community solar project and their patience with us and our CCS

partners -- thirteen from Hanover and five more from other Upper Valley towns. We admire our CCS partners and feel privileged being in a group of good folks trying to make a difference. I personally am excited to be catching up with some of my colleagues and neighbors; I, too, now enjoy regularly looking online at the CCS display that calculates not only our array's current and lifetime production of electricity but also the equivalent in trees planted and gas saved. It is gratifying to look at the online map of solar installations in Hanover, seeing a purple circle indicating community solar for 31 Rip Road, and knowing Stan and I are doing our part to help Hanover reach its 100% renewable energy goals. I can honestly say that having made this commitment and being a small part of this movement to save our earth is a joy.

So what about you? I am confident that Norwich Solar Technologies and our other trusted solar installers will be planning similar projects for the future. I also know that Sustainable Hanover has an ever-increasing supply of mentors ready to answer your questions and hold you hand should you, too, venture forth. By all means, please consider going solar. We would love your good company. (For more information, please be in touch with our solarize team at sustainablehanovernh@gmail.com.)

	TABLE: Show Me the Numbers!	
Anticipated Electrical Consumption Per Year (kWh)		
	Current Consumption	6,300
	Heat Pump	3,500
	Electric Vehicle (15k per yr)	4,500
	TOTAL	14,300
Installed Solar Necessary to Meet Anticipated Needs (Watts)		
	1 Watt of Installed Solar Generates ~ 1.2 kWh Per Year in NH	11,917
Number of Solar Panels Needed		
	Size of Charlestown Solar Panels (Watts)	370
	# of Panels Needed	32.2
Costs		
	System Cost (Gross)	$ 35,040
	Federal Tax Credit (FTC) - 26%	$ 9,110
	System Cost (Net FTC)	$ 25,930
Return on Investment (ROI)		
	~Total kWh Generated Per Year	14,208
	Credit per kWh from Liberty Utilities (Increase ~2% per Year)	0.125
	Total Credit per Year - Gross	1,776
	Total Credit per Year - 10% Mgm Fee if Sell RECs	1,598
	Total Credit per Year - 25% Mgm Fee if Keep RECs	1,332
	ROI in Years - Sell RECs	14 - 15
	ROI in Years - Keep RECs	16 - 17

A Network of Electric Vehicles Owners

Ben Steele

This fall, Sustainable Hanover sent out a survey to learn more about Upper Valley residents who owned an electric vehicle (EV), either all-electric or plug-in hybrid. We asked whether they would be willing to share their EV experiences with other potential buyers. Our idea was that having access to someone who already owns an EV might help potential buyers make this transition. In addition to developing this list of volunteers, we learned some interesting things about EV owners.

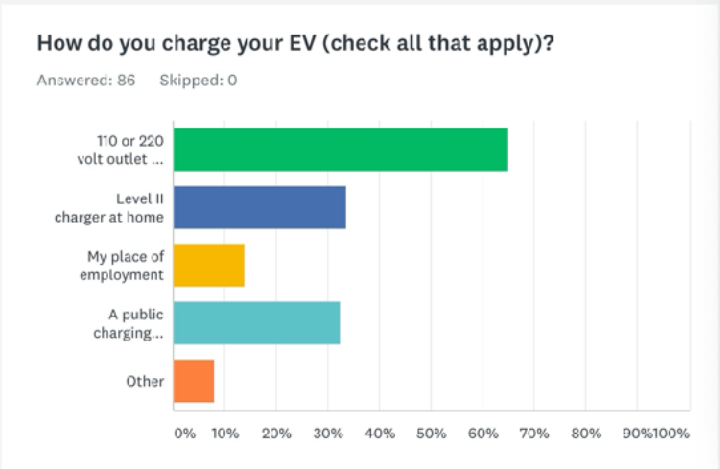
Our survey asked respondents what model EV they owned, how they charged it, and if they were willing to share information about their EV. We also included a comment section. We advertised in the Hanover and Upper Valley list serves as well as the Hanover town email list. EV owners quickly forwarded the link to other EV enthusiasts, many living outside the Upper Valley. We ended up with 86 respondents. Sixty-five agreed to make themselves available to potential buyers.

The results were diverse. Together, our respondents owned seventeen different types of EV's (not including a Mr. Ed who claimed to drive a horse and buggy). I was surprised that all-electrics (52) outnumbered plug-in hybrids (32). The all-electrics were dominated by Tesla's, including models S, X, Y and 3 (23), followed by Chevy Bolt's (17). Toyota Prius Primes dominated the plug-in hybrids (15). Sixty-five percent of respondents charge their vehicles with regular 120 volt outlet (Level 1 charging) and thirty-four percent have installed a Level 2 (240 volt) charger at home. Only 14% were able to charge at their place of employment, a percentage we hope will increase in the future.

We were surprised and delighted by the level of enthusiasm expressed by owners willing to encourage others to adopt an EV. The comment section

included positive remarks, constructive suggestions, and offers of help. These owners greatly expanded our expertise, sharing knowledge about installing chargers and how to find free chargers on a long road trip. Several participants forwarded our survey results to their friends with EVs who, in turn, provided us with more data. We now have input from folks well beyond the Upper Valley -- Andover and Laconia, NH, even Andover, MA (well, with a house in Barnard, VT). Perhaps our most valuable insights came from an EV owner who was also a Chevy salesperson. She explained why dealers hesitate to promote EVs. For one thing, they need to train technicians and install chargers, both costing a lot of money. Moreover, there is a general feeling that EVs are only a passing fad.

Our next steps are to alert potential EV buyers that we have relevant information to share -- fact sheets on the difference between all-electric cars and plug-in hybrids, methods of charging, how to install chargers, and, most important, contact information for currents EV owners. We also plan to explore working with dealerships, perhaps partnering to promote EVs. For any of this information, email me at bsteele@colby-sawyer.edu.



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Although this is a beautiful picture, it may be a bad sign that this house is leaking heat.

The Greenest Energy Is the Energy You Don't Use

Barbara Callaway

Washington Post reporter Sarah Kaplan, who covers climate solutions, reports that she gets one question more than any other. "What's the best thing for me to do to protect the planet?" Her answer is that it depends on where one has leverage. But "for people who own their own homes (or have a good relationship with their landlords), it is 'weatherization'-- sealing up your home so you don't waste energy on heating and cooling that is lost to the outside world." With home weatherization you not only shrink your carbon footprint, you also make your house more comfortable, save money, and you may be able to get help paying for it!!

Who Knew?

A number of your Hanover neighbors have already sought out information about weatherization, completed energy audits, and even completed their weatherization projects in spite of the pandemic? Last year, 18 Hanover residents received rebates for their home weatherization projects.

Use It or Lose It?

Electric utilities in NH are required to contribute to a fund that provides rebates for energy efficiency including home weatherization. The money for the fund comes from the System Benefits Charge on your electric bill. You contributed to the fund called NH Saves, why not use it???

How Much Can I Get?

You may receive a rebate for up to 75% of your home weatherization project cost up to $8000. To qualify, you fill out a rebate application at nhsaves.org. Be sure to include all forms of fuel that you use to heat your home, heating oil, natural gas, electric baseboard heating, heat pumps and wood. Qualification for rebates is based on the amount of energy you use per square foot of conditioned space - not on your income. (There is another program for citizens with low income for home weatherization.)

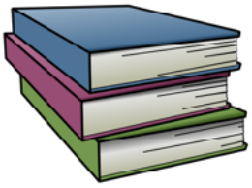
What Then?

If you qualify, you will be connected to a contractor already vetted by the program, who agrees to charge a preset amount for each step. The contractor is periodically checked for quality assurance and follows strict COVID procedures. The contractor will do an energy audit on your home and write up a report including suggested remediation strategies as well as the cost of each strategy.

Where Do I Start?

For more information go to NHsaves.org and to hanovernh.org/weatherize for more information and step by step guides to the weatherization process.

Contact bcallaway65@gmail.com if you would like to talk to another Hanover resident who has completed a home weatherization project, to hear about their experience, and ask your questions.



Looking for a Good Read?

Barbara Callaway

Hanover's Community Climate Connections committee invites you to join us on our journey to discover good books about the environment and climate change. Many books on these topics can be overwhelming and even depressing, so we've uncovered a few which we think provide some different perspectives. They are thought-provoking, well-written, inspirational and practical. We've tried to stay away from doom and gloom!

1. The Overstory by Richard Powers (W.W. Norton, 2018)

The heroes of this book are centuries old and over 300 ft. tall. They are trees that actually do the things we do, just more slowly. "They compete for their livelihoods and take care of their families sometimes making huge sacrifices for their children. They breath, eat and have sex. They give gifts, communicate, learn, remember and record the important events of their lives. With relatives and non-kin alike they cooperate, forming neighborhood watch committees--to name one example--with rapid response networks to alert others to a threatening intruder." says Barbara Kingsolver. The trees in this novel play a part in the riveting stories of the humans in their lives. This book won a Pulitzer Prize.

2. Braiding Sweetgrass by Robin Wall Kimmerer (Milkweed Editions, 2013)

"What is it that has enabled them [mosses] to persist for 350 million years, through every kind of catastrophe, every climate change that's ever happened on this planet, and what might we learn from that?" asks Robin Wall Kimmerer. She lists the lessons: "being small, giving more than you take, working with natural law, sticking together." She's spent a career as a botanist learning how to ask questions of nature using the tools of science. As a Potawatomi woman, she's learned from elders, family, and history that the Potawatomi, as well as a majority of other cultures indigenous to this landconsider plants and animals to be our oldest teachers. In Braiding Sweetgrass, Kimmerer brings these two ways of knowing together to reveal what it means to see humans as "the younger brothers of creation." This book won the 2014 Olsen Nature Award.

3. A Life on Our Planet by David Attenborough. (Ebury Publishing, 2020)

Attenborough looks back on his long career as a writer and film documentarian of the natural world. Over a 70 year career he has seen areas of wilderness in the world decline precipitously and he reflects on the changes he has seen. This book and film are his witness statement of what he has seen

and his optimistic vision for the future. (Also a movie on Netflix)

4. The Invention of Nature: Alexander von Humboldt's New World by Andrea Wulf (Knopf, 2015)

Historian Andrea Wulf follows the life of the Prussian naturalist, explorer and geographer, Alexander von Humboldt, from his early childhood and travels through Europe to his journey through Latin America and his return to Europe. She shows how Humboldt synthesized knowledge from many different fields to form a vision of nature as one interconnected system. His vision gained a wide popular following including the young Charles Darwin. This was one of the 2015 NY Times 10 Best Books.

5. Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming by Paul Hawken (Random House, 2017)

"Drawdown" is the point where greenhouse gases in the atmosphere peak and come down. Hawken organized an international coalition of leading researchers to map, model, and measure the most substantive solutions which could make drawdown a reality. This book is easy to digest, and interesting to read. It presents a list of solutions ranked by their potential to reduce carbon and gives brief explanations of each with wonderful photographs as well as cost estimates to ramp them up. These solutions, if deployed collectively on a global scale over the next thirty years could not just slow the earth's warming but reach "drawdown," the point at which greenhouse gasses begin declining.

Happy Reading!!!

Please let us know of other books you would like to share as well. Email: jpsundaypainter@gmail.com with your suggestions.

Climate Community Connections or "C3" is a group of Hanover residents committed to supporting the Sustainable Hanover Committee and sharing information about the environment and ways citizens may become involved in mitigating climate change. We write "Who Knews" for the Hanover Listserve which include interesting factoids about the environment and ways to help preserve it, as well as helpful information about topics such as recycling, interesting upcoming events and Weatherize Hanover. Last winter pre-pandemic, we sponsored two "Climate Conversations," one on the impact of our clothing on the environment and the other on waste. We hope to continue these in the future. We are also developing a Legislative Action group for those who would like to support good climate legislation in NH.

If you would be interested in helping with the legislative initiative or being a part of "C3", please email Sarah Young: sierrasly@gmail.com

IMPORTANT COMPOSTING UPDATE

The Sustainable Hanover Committee's website (https://www.hanovernh.org/sustainable-hanover-committee/pages/composting-resources-hanover-residents) provides a comprehensive resource on composting options:

- COOP: take your food scraps to the three COOP stores;
- werecyclefood.com for curbside service;
- Lebanon Solid Waste Management Facility is now accepting food waste (https://lebanonnh.gov/450/Solid-Waste-Recycling)

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