Earth Closes In On 1.5°C Increase

Roy Morrison

Three all time global records in 2023. In June, global oil consumption reached an all time high of 103 million barrels a day according to the International Energy Agency (IEA). In July we had the hottest month ever in in recorded history. In July we also reached the 1.5°C global temperature increase in a summer of murderous heat, epic floods and huge wild fires.

We are in a fundamental ecological crisis threatening the future of the ecosphere and human civilization. What can we do about it? There is much that we can and must do individually and collectively. It’s time for action, not despair. Labor organizer Joe Hill facing execution wrote, “Don’t waste any time mourning,” and encourages us to “Organize!”

The recent Earth Commission Report on Global Health from 40 scientists quantify five key biophysical processes that regulate the health of the Earth system globally and regionally. These are: tackling the global climate emergency; stemming effects of aerosols to ensure human and planetary health; protecting a thriving biodiversity; and encouraging us to “Organize!”

How did they stay cool before electricity?

Jessie Haas

Between the towns of Putney and Westminster West in the Connecticut River valley in Vermont there is a sloping stretch of road, wooded on both sides and with a small brook trickling through it. As you drive up from the river valley, the temperature always drops two, three, even four degrees along this one half-mile, and on a hot day you feel like stopping and staying awhile. By no means is this phenomenon unique to Vermont.

For thousands of years in Egypt and Iran, the combination of shade, moving air, and moving water has been harnessed in the form of windcatchers. Draft is created by a tower, a chimney which creates a draft, pulling in air from a colder place. Usually this is an underground tunnel with a distant opening. The air is cooled by the earth as it is drawn through the tunnel. Some windcatcher systems use an underground canal which provides water to the home as well. In this climate the air being drawn in is extremely dry, which creates a lot of evaporative cooling in the tunnel. Both air and water are cooled. In extremely well-designed systems, the water temperature may approach freezing. The windcatchers provide air conditioning, cold water, and refrigeration—all without burning a drop of fossil fuels, and all in a very hot environment.

The southern Spanish city of Seville is experimenting with this ancient cooling technology as heatwaves continue. (AdobeStock_103929310)

Concentration of CO2 in the Atmosphere

Learn more at www.CO2.earth.
LETTER FROM THE EDITOR

I think the big message in this edition is that climate change is here, now! And it is not pretty. But we hope you can find useful information and solutions by reading the information in this and every edition. Solutions are at our fingertips. The technologies to change things are available now. We just need to do them. No excuse is acceptable today. Where there is a will, there is a way. The IRA and state incentives can help fund some of the big items. But a huge part is up to you and me.

In case you did not notice and ask why, as Senator Bernie Sanders said (see p.3), “Just look around.” It has been a crazy two months since our June edition came out. The disasters in Canada and our unhealthy air situation was a big story back in June. Then came one disaster after another. Floods in VT and NY followed. How about the heat wave that did damages in Massachusetts the first week of August. And after all that, hurricane season is starting. Maui, Hawaii experienced the worst floods they have ever endured.-speaking at a news conference on August 11, 2022, Governor Josh Dr. (D) stated: “Climate change is here, and it’s affecting the islands.” Clearly disasters have increased incredibly. It seems that the climate is certainly now out of control and so very unpredictable. We have not even mentioned the slowing of the ocean currents and what that means.

Please read Bernie’s message in our climate news section on p.3. I am concerned that part of his message might not make enough of an impact. Bernie said, “At every level, in every country, we must work aggressively to save the planet for our kids and future generations.”

As the I write this, most parents are getting ready to send the kids back to school. Thinking long beyond this school year is what we should all be taking as serious as this – right now. We each need to do more. It is the choices we each make every day that will make or break it.

The pages of G.E.T. are intended to help you improve in your own life regarding what is ahead and how to keep the CO2 levels below 1.5°C to leave a livable planet for our children and grandchildren. Together each of us is to take the situation as serious as it is — right now. We each need to do more. It is the choices we each make every day that will make it or break it.

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Bernie Sanders

G.E.T.

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THE IMPACTS OF CLIMATE CHANGE
Bernie Asks You to “Look Around”

A Letter from Bernie Sanders

LOOK AROUND:
Over the last few days, nearly two-thirds of the population of the United States of America was living under either a flood warning, watch, or a heat advisory. Temperatures in the Atlantic Ocean are the highest ever recorded. Wildfires are raging parts of Greece. A typhoon has forced tens of thousands of people from their homes in Beijing. And July is on track to be the hottest month in recorded history. Meanwhile, the latest report from the United Nations’ Intergovernmental Panel on Climate Change (IPCC) is very clear and it is very foreboding.

If the United States, China and the rest of the world do not act extremely aggressively in cutting carbon emissions, our planet will face enormous and irreversible damage. Let me be clear about that last part: If the entire planet, led by the largest economies in the world, the United States of America and China, does not get its act together, the world that we will be leaving our children and future generations will be increasingly unhealthy and uninhabitable.

What makes this issue so difficult and so complicated is that it is a crisis that no individual nation can solve alone for its own people. It is a global crisis. It is an issue that requires the cooperation of every nation on earth. Whether we like it or not, we are all in this together.

Just one example. Despite the frightening impact of climate change on the United States, highly populated Asian countries are facing even more challenges. Sealevels on China’s coastline are rising more quickly than the global average. Major cities like Shanghai, Tianjin and Shenzhen are all located along the Chinese coast and could face catastrophic flooding in years to come — creating havoc with the entire Chinese economy. There are projections that Shanghai, a city of 24 million, could be underwater by the end of the century.

Now, the bad news is that developing a mutually beneficial relationship with China to save the future of this planet will not be easy. Sadly, there are “hawks” in both countries who are working hard to create a new cold war.

The good news is that we still have time — the United States, China and other countries around the world — to make the decision to act aggressively in combating climate change and prevent irreparable damage to our country and the planet.

While we must work diligently to foster international cooperation on climate change, we must also do something else. In the United States, and around the world, we must ask a very simple question. How did we get here? How did we get to a place in time where the health and well-being of the entire planet, and the lives of billions of people, is under enormous threat?

And the answer is not complicated.
The truth is that the scientific community, for many decades, has made it clear that climate change is occurring and all the dangers it poses: in terms of drought, floods, extreme weather disturbances, and disease is the result of carbon emissions from the fossil fuel industry.

As far back as the late 1950s, over 60 years ago, physicist Edward Teller and other scientists were warning executives in the fossil fuel industry that carbon emissions were “contaminating the atmosphere” and causing a “greenhouse effect” that could eventually lead to temperature increases “sufficient to melt the icecap and submerge New York.” That’s what they were saying 60 years ago! In 1972, Shell-backed research concluded that increasing atmospheric carbon concentrations could cause global temperature increases that would drive “major climatic climatic changes” and compared the dangers of burning fossil fuels to nuclear war.

Beginning in the late 1970s, Exxon — now ExxonMobil — conducted extensive research on climate change that predicted current rising temperatures “correctly and skillfully.”

The fossil fuel companies knew. They knew they were causing global warming and therefore threatening the very existence of the planet.

Yet, in pursuit of profit, fossil fuel executives not only refused to publicly acknowledge what they had learned but, year after year, lied about the existential threat that climate change posed for our planet.

So what happened to the CEOs who betrayed the American people and the global community? Were they fired from their jobs? Were they condemned by punitive cable television and the editorial boards of major newspapers? Were they prosecuted? Did they go to jail for their crimes?

Nope. Not at all. Not a one of them. These CEOs got rich.

It’s obscene. When a criminal walks into a store and shoots the clerk behind the counter, we make the moral judgment that this behavior is socially unacceptable, and that the gunman should be punished.

When a public official misuses and steals taxpayer money, we make the moral judgment that the embezzler should lose his job and, perhaps, be incarcerated.

Yet, when fossil fuel executives make calculated decisions that are life-threatening to millions of people — or to the planet — we are told that “it’s just business.”

No. That’s just not acceptable. That is why, earlier this week, I sent a letter to Attorney General Merrick Garland urging him to bring lawsuits against the fossil fuel industry for its long-standing and carefully coordinated campaign to mislead consumers and discredit climate science in pursuit of massive profits. The letter was co-signed by Senators Merkley, Warren, and Markey.

Like the tobacco industry before them, the actions of ExxonMobil, Shell, and potentially other fossil fuel companies represent a clear violation of federal racketeering laws, truth in advertising laws, consumer protection laws, and potentially other laws — and the Department of Justice must act swiftly to hold them accountable for their unlawful actions.

More than 40 states and municipalities have filed lawsuits that seek to hold the fossil fuel industry accountable for their illegal campaign of misinformation around the global crisis of climate change.

The Department of Justice must join the fight and work with partners at the Federal Trade Commission and other law enforcement agencies to file suits against all those who participated in the fossil fuel industry’s illegal conspiracy of lies and deception.

The fossil fuel industry must begin to pay for the extraordinary damage they are causing.

Climate change is an existential threat to every person on earth. At every level, in every country, we must work aggressively to save the planet for our kids and future generations.

Let’s go forward together.

In solidarity,
Bernie Sanders
EV Sales Continue to Soar, but a Surge in Production Could Lead to a Glut

Waiting lists may be a thing of the past for many EV models as automakers try to balance supply and demand. One outcome: lower sticker prices.

Dan Gearino

For years, many people who wanted electric vehicles had to get on a list and wait for months to take delivery—the result of demand that exceeded supply.

This equation is now changing. Automakers have increased EV production, and dealer lots have gone from a scarcity of options to, in some cases, a glut.

The shift to EVs needs to happen quickly if the United States and the world are going to make rapid progress in cutting carbon emissions. But we don’t yet know how large the public’s appetite is for electric vehicles, or whether auto dealers are ready to sell them in large numbers.

The stakes and the uncertainty can be overwhelming, but there are some encouraging signs.

In the first half of 2023, U.S. customers bought 556,707 electric vehicles, which was up 47 percent from the first half of last year, according to Kelley Blue Book. EV market share was 7.2 percent of the U.S. market for cars and light trucks, which was up from 5.7 percent in 2022 and 3.1 percent in 2021.

Some indicators are less encouraging. One of them is how demand for some EV models is not keeping up with the growth in supply.

“While demand is increasing, production is increasing faster,” said Michelle Krebs, an analyst for Cox Automotive. “This month, U.S. dealers have an average of 103 days of supply of EVs, which is roughly double the average of 53 days of supply of all models in the market, according to Cox Automotive.

This is a metric that considers how long it would take to run out of a model if the sales rate remains the same and no new inventory arrives. A good rule of thumb is that 60 days of supply is optimal. Note that the figures don’t include Tesla or Rivian, since those companies’ direct-to-consumer approach to sales limits the ability to collect data.

The Kia EV6, Nissan Leaf and Volkswagen ID.4 are among the EV models that have at least 120 days of supply. One way dealers can stimulate sales is to cut prices, and that’s happening for some EVs. Tesla and Ford are among the automakers that have reduced prices.

Ford said its price cut for the Ford F-150 Lightning is a response to gaining efficiencies from an increase in production and because of a drop in costs for battery materials. Pricing for the Lightning now starts at $49,995, down about $10,000 from before this month’s price reduction. This number doesn’t include a federal tax credit of up to $7,500, which is also true of the other vehicle prices we are listing today.

Tesla CEO Elon Musk said the price cuts were a response, in part, to rising interest rates. His company has had several rounds of price changes, most of them cuts. The company has changed its mind about discontinuing the Bolt. Instead of going away, the model will get a redesign that will include technology upgrades.

“Our customers love today’s Bolt,” she said. “It has been delivering record sales and some of the highest customer satisfaction and loyalty scores in the industry.”

The company didn’t say when the new Bolt would go on sale. The current versions are likely to stop production late this year, followed by a hiatus until the new design or designs become available.

The Bolt is an important vehicle in the EV market because of its relatively low price, with the subcompact hatchback version starting at $26,500 and the subcompact SUV version, called the “Bolt EUV,” starting at $27,800. The model also has long range relative to the price, with a battery capable of going more than 250 miles on a charge. And the Bolt is an example of an EV that is selling about as fast as dealers are getting them, with 30 days of supply for the hatchback and 23 days for the SUV, two of the lowest numbers in the market.

Krebs of Cox Automotive said to expect ups and downs as automakers feel their way through the shift to EVs.

“We have to understand this is the biggest transition in the history of the auto industry since Henry Ford made the moving assembly line,” she said. “It is not going to be linear. There are going to be big bumps in the road.”

Dan Gearino covers the midwestern United States, part of Inside Climate News’s National Environment Reporting Network.

Beatriz Olivieri

When most people think about electric vehicles (EVs), Tesla immediately comes to mind, which makes sense given that Elon Musk’s company has the largest EV charging network in North America, with 2,050 stations and over 22,000 plugs, 12,000 of those in the United States. To help paint the picture, according to the U.S. Department of Energy, there are 36,000 EV charging plugs in the United States. Even though most EV owners charge their cars at home, one of the main concerns regarding EVs is the charging speed, especially when discussing long-distance traveling. This scenario is where Level 3 charging, DC fast charging, becomes ideal as it draws direct current (DC) off the grid and allows you to get from 20% to 80% (charge level) in about half an hour, depending on your vehicle. As of July 2023, there are 32,000 publicly available DC fast charging stations, a ratio of 72 cars per charger (Kessler, 2023). Most EVs except Tesla are manufactured with the Common Charging Standard (CCS), the shape of the charging connector used for DC fast charging.

Tesla has developed what they call “Supercharger,” a 480-volt direct-current fast-charging technology, which allows you to charge your car for a range up to 200 miles as quickly as fifteen minutes. Currently, the American EV giant owns and operates more than 45,000 Superchargers globally that are available to customers 24/7 through major routes near convenient amenities. Nevertheless, Superchargers use proprietary charging plugs meaning that non-Tesla EVs cannot access such technology. As mentioned, Tesla has its own ports, the North American Charging Standard-NACS. Ultimately, getting connected is a crucial point of the universalization of EV charging and the further adoption of EVs. Tesla has announced the development of “Magic Docks” to democratize access to Supercharger technology. What is there to know about Tesla’s Magic Docks? Retrofitting the existing charging location with a new adapter makes it possible for a non-Tesla EV to plug in. In such a manner, Magic Dock stations can serve both Tesla owners and other EVs through the Tesla app, which opens up a CCS adapter. We are looking at 7,500 Supercharger Magic Docks stations to be open for more EVs by the end of 2024 (Motavalli, 2023).

Simultaneously, multiple manufacturers such as General Motors, Ford, Polestar (Volvo’s EV exclusive brand), Rivian, and Volvo are set to adopt NACS by 2025. What is being called “the great NACS migration” reinforces the commitment to an all-electric future. As General Motors CEO Mary Barra announced, “the better experience people have, the faster EV adoption will grow” (Kessler, 2023). Moreover, the venture of the seven of the world’s leading automakers to accelerate EV adoption is also related to enhancing the customer experience with comfort and well-being features such as “restrooms, food service and retail operations either nearby or within the same complex” (Kessler, 2023). Looking ahead, making this manufacturing switch will allow customers to access the Tesla Superchargers that are Magic Docks. While Magic Docks seems like a promising idea, the current EV owner from the famous “Plug and Play EV” YouTube channel highlights how not one of the eight Tesla stalls worked for me, claiming it was the least successful charge session in seven years of EV driving. Alan Lau and Amir Saidi from MotorTrend had similar issues with a low success rate. Also, they brought to attention that there are challenges related to EVs having different charging ports’ positions from Tesla models, which leads to how-to-park problems.

As the United States aims to reach net-zero emissions no later than 2050, the electrification of our fleet will be a crucial step toward this achievement. To pursue this goal the Bipartisan Infrastructure Law (BIL) was enacted as the Infrastructure Investment and Jobs Act (IIJA) on November 15, 2021, and established the National Electric Vehicle Infrastructure Formula Program and the Charging and Fueling Infrastructure Discretionary Grant Program. The US government is looking to have by 2030 more than 500,000 EV chargers available to the public ensuring a more reliable, affordable, and equitable experience for all EV users. With the right incentives and policies in place, US industries can become a global reference in transportation electrification efforts creating new business opportunities in the country. Regionally, in New Hampshire, there appears to be little guidance about EV targets needed to meet decarbonization goals as of now. In conclusion, as demand and public attention gravitate towards this topic, we expect a lot of innovation and improvement in the constant-growing field of electric vehicles.

Notes and source links available with the posting of this article on our website at www.greenenergymtimes.org.

Beatriz Olivieri, a native of Rio de Janeiro, Brazil, is deeply passionate about the intersection of climate and energy. With an MS degree in Sustainability Science, she is currently serving as a Sustainability Fellow at Green Wave Electric Vehicles this summer. Beatriz is actively reshaping the organization’s internal practices with the goal of ingraining sustainability into its very DNA.

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**Truck's Solution to Climate Change**

Roddy Scheer and Doug Moss

While no one likes to see companies fail and people lose their livelihoods, some environmental advocates do see the recent collapse of Yellow Trucking as a way to force the industry down a greener path. After all, the transportation sector is the largest U.S. carbon dioxide (CO2) polluter, generating 20 percent of all domestic emissions. The freight trucking sector alone is responsible for roughly half of that. Given the slowness of trucking to adopt greener fuels, drivetrains and operations, environmental advocates see a lot of low-hanging fruit for reducing transportation's carbon footprint.

What can trucking do to start becoming part of the solution to climate change? The obvious place to start is the adoption of electric vehicles (EVs). There is no reason the same technologies now so widespread for passenger cars can’t be implemented at a scale for trucks, too. Indeed, Tesla is showing the way with the recent roll-out of its all-electric “Semi,” currently in use by a handful of major corporations and soon to be more common on U.S. highways. To that end, Tesla recently applied for $100 million in grant funding to develop a recharging infrastructure for EV trucks traveling between Texas and California. Tesla isn’t alone in trying to electrify trucking. At least 17 other manufacturers (e.g., BYD, Mercedes-Benz, Freightliner, Volvo, Tata) are competing for pieces of the EV truck pie.

Besides a wholesale move to EVs, there’s a lot we can do to “green” truck operations. Encouraging the use of alternative fuels such as natural gas and biodiesel where applicable is a no-brainer. Meanwhile, enhancing the aerodynamics of trucks and trailers can reduce fuel consumption and emissions. Installing technologies like side skirts, boat tails and better tires can make a big difference in fuel efficiency.

Another way to green trucking is to implement so-called “smart logistics”—using advanced technology for route planning and load optimization to reduce fuel consumption and emissions. Likewise, providing training to truck drivers on fuel-efficient driving practices and rewarding drivers for fuel-efficient behaviors can lead to significant fuel and emission savings. Employing real-time monitoring and data analytics to track fuel consumption, emissions and operational efficiency can help identify areas for improvement and further optimize trucking operations. And promoting freight consolidation and intermodal transportation—combining multiple modes such as rail and truck—can reduce emissions by shifting some of the freight transport load to greener modes like rail, thus reducing the trucks on the road.

In 2022, the Biden administration unveiled strict standards on emissions from trucks, vans and buses starting in the 2027 model year, the first update to clean air standards for heavy-duty vehicles in more than 20 years. Environmental advocates see this as a long time coming and still not enough—and the trucking industry is challenging the new regulations, claiming they are too onerous. We’ll see how things shake out for the trucks of the near future when the dust settles in this fight over regulations.

Roddy Scheer and Doug Moss produce EarthTALK®. Read more articles online at https://emagazine.com.

**Renewed E-Bike Subsidies for Vermont Residents**

The State of Vermont is offering a limited-time incentive program to consumers for the purchase of eligible electric bicycles. The incentives are available to eligible Vermont residents on a first-come, first-served basis contingent upon funding availability. Consumers will apply to receive a prepaid debit card with the incentive amount to be processed by a participating e-bike retailer. This program was reauthorized with $150,000 through the 2023 Budget Adjustment Act and FY2024 transportation bill (H.479). Learn more at https://bit.ly/ebike_incentives.

**Truck's Solution to Climate Change**

V-shaped roof design allows for rainwater collection and maximizes solar collection. The building is oriented to take advantage of the site’s southern exposure. (Black River Design Architects)

**Upper Valley Transportation Center Receives Two Energy Efficiency Awards**

Tri-Valley Transit is proud to announce that the Upper Valley Community Transportation Center (UVCTC) in Bradford, VT designed by Black River Design Architects has recently been awarded an Efficiency Vermont Small New Construction Best of the Best award and a Net-Zero Award and Vermont Green Building Award from the Vermont Green Building Network in the non-residential/commercial/multi-family category.

The UVCTC is the newest net-zero-electric and fossil-fuel-free home for Tri-Valley Transit and is located adjacent to the Bradford Park and Ride, just off Interstate 91. The project includes drive-through bus storage bays, a bus wash with rainwater collection system, and administrative offices including a conference room and driver break room.

“Improving environmental health is at the core of TVT’s mission,” said Jim Moulton, Executive Director, Tri-Valley Transit. “We know public transit is better for the environment than driving alone, and by investing in features to make the Upper Valley Community Transportation Center more efficient we have been able to further our commitment to reducing our environmental impact.”

Those features include a tight building envelope and a wood-pellet-heated radiant floor slab in the bus storage bays to keep buses above freezing between routes. Rainwater collected from the roof is stored in an underground tank and is used to wash buses. Clerestory windows provide natural daylight and rooftop and ground-mounted solar arrays produce approximately twice the electricity the facility currently uses. The surplus electricity is currently helping to power other TVT locations, and in the near future, it will be used for charging new electric buses.

In the administrative wing, windows provide natural daylight which is supplemented by energy efficient LED light fixtures. Air source heat pumps warm or cool the space and low embodied carbon materials were selected wherever possible, within the limitations of the budget. Some choices that were made include wood framing in the office wing, instead of steel, and polished concrete floors.

Cont’d on p15

**Renewed E-Bike Subsidies for Vermont Residents**

E-BIKE SALE!

**Renewed E-Bike Subsidies for Vermont Residents**

E-BIKE SALE!

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South Pack Solar (SPS) is a solar installer in Peterborough, New Hampshire. There are several things about the company that set it apart, and for some people it will be very worthwhile to take a look at what they are.

The company is one of the older solar businesses in New Hampshire. It was founded as Gregory Blake Consulting in April 1998, but in time the business came to focus on solar photovoltaic (PVs). In 2011 its name was changed to reflect this, and it became South Pack Solar (SPS).

Much of the work SPS does is in the Monadnock region of New Hampshire, where it has installed over 300 systems. Together, those systems represent 1.5 megawatts of solar PVs. It has also taken on more than 300 installations in other regions of the country. Typically, the company works on thirty to forty systems per year. Thirty to forty installations per year does not make SPS a big business. Blake explains this by saying, “This relatively small scale allows us to take the necessary time to design and construct the best built and best value system for our customers using the appropriate technology for the particular site.”

He calls the business model used by large competitors as a “cookie-cutter approach” and makes it clear the distinction between that and his strategy of careful design and construction.

Blake’s business model is unusual in other ways, as well. The people he works with are not an ordinary set of employees. To start with, Blake is a Solar Energy International Solar Professional, which certifies the highest level of competency. Beyond that, it seems that several of the people who work at SPS are masters in their own right. Importantly, Bob Gesick is a Master Electrician, certified in New Hampshire. Others who can be called in to add their own skills on a project include Tim and Andrew Rousseau, of Rousseau’s Custom Carpentry; Sean Macy, owner of Frost Pond Carpentry; Josh Kennedy, owner of Josh Kennedy Custom Builder, LLC, Seth Kallman (Kallman Creek), Andy Jenks (Wind Blown tree & Tractor); and Rick and Bodie Swain, Tim Hopkins and Joe Bernstein. Altogether, about thirteen local craftsmen could be called in for any given installation, though not usually more than four at any one time.

It is evident that Blake wants his designs for solar systems to be executed to the highest standards. Also clearly, to achieve that level, the standards must apply not only to craftsmen, but also to the materials used. “We use only the best components including Enphase Energy, Fronius, Schneider and modules listed on Bloomberg Business Tier 1 list. Exclusively Ecofasten rail-less roof mounting and ground mounts supplied by MT Solar and Preformed. Ground mounts offerings include pole mount, ballasted, pounded I-beam configurations.”

Of special interest, SPC is not a growing business, and there is a good reason for that. Blake said it is “intentionally compact in order to remain nimble and efficient and best serve its local customers.” Because of this, he depends largely on word-of-mouth referrals, and very limited, local advertising. “We at Green Energy Times are proud to have his advertising in our publication – the ad in this issue can be seen at page 8.”

Blake has noted that such work not only can reduce the customers’ costs, it can “provide them with the sense of accomplishment and pride that only comes with having built their own array!”

Perhaps, considering how different the South Pack Solar business model is, we should not be surprised that it does not have a “brick and mortar storefront.” It has a Peterborough warehouse of 4,500 square feet, which it uses to receive, store, and distribute all sorts of components. Gregory Blake can be contacted at (603) 491-5198 or emailed at greg@southpacksolar.com. Learn more at the South Pack Solar website at www.southpacksolar.com.
Low-to-moderate-income Solar Projects Awarded Funding

In 2020, Lake Region Community Developers installed solar panels on some of its Pine Hill duplexes in Laconia, NH. (Courtesy of LRCD)

Hadley Barndollar

This June, the NH Executive Council approved funding for four solar projects that will benefit low-to-moderate-income residents in Laconia, Newmarket, Weare, and the Center Harbor area.

Councillors approved close to $1 million from the Department of Energy’s (DOE) Renewable Energy Fund, which supports thermal and electrical renewable energy initiatives. State statute requires that the department provide no less than 15% of REF funds annually to benefit low-to-moderate-income residential customers.

The following four projects, benefiting a total of 61 households, were awarded funding:

1. Laconia Area Community Land Trust Inc., doing business as Lakes Region Community Developers, received $124,748 to work with a developer to install and operate solar photovoltaic systems interconnected to eight non-profit-owned affordable housing units in Laconia. The systems will provide electricity to the tenants of the buildings, and each household will save an estimated $776 a year as a result.

2. The Newmarket Housing Authority received $370,188 to install 22 separate rooftop solar arrays. The project will benefit 21 residential units and an office building. Households will receive on-bill credits on residential electric bills as a result of the solar arrays, and save an estimated $916 per year.

3. The Plymouth Area Renewable Energy Initiative received $109,000 to install a ground-mount solar array to benefit low-to-moderate-income residential electric customers in Center Harbor, Moultonborough, Holderness, and Sandwich. Part of a program called “NH Solar Shores,” households will receive a “solar share” credit on their electric bill, which is expected to reduce monthly bills by $31 to $34. The project is being done in collaboration with the New Hampshire Energy Cooperative, which will provide the direct on-bill credits. A community solar “garden” will be developed at the Lakes Region Conservation Trust, and an educational solar trail around the array will link to a walking trail on conservation property.

4. The Regenerative Roots Association, a Nashua-based organization focused on resilient local food systems, received $375,000 to work with a developer to design and build a community solar project on land it owns in Weare, to ultimately benefit low-to-moderate-income residential electric customers. Under the state’s Group Net Metering Program, the Regenerative Roots Association will serve as the host and 15 host-owned households will be members receiving on-bill credits. RRA will retain 15 percent, and 75 percent of the 85% generation revenue will go directly to participants’ residential electric bills. Households are expected to save an average of $1,388 annually.

With new funding from the DOE, the entity will be installing more at other affordable housing sites.


Hadley Barndollar covers climate, energy, environment, and the opioid crisis for the New Hampshire Bulletin. Previously, she was the New England regional reporter for the USA TODAY Network and was named Reporter of the Year by the New England Newspaper and Press Association. Email: hbarndollar@newhampshirebulletin.com.
Portable Power When and Where You Want It

We never know when power is going to go out, but rest assured, it will. Planning for that time is probably a good idea. Just this summer alone there have been many emergencies from storms, hurricanes, tornadoes, and flooding, and in other places, volcanoes, typhoons in the news almost daily. “This is the new norm” as New York Governor Kathy Hochul said, when addressing the flooding and devastation in the Hudson River valley. “Climate change is here and things are only going to get worse.”

It’s important to take precautions so that you and your household can remain safe when the power does go out. I had the opportunity to test an Outlaw 1072s 1000W Lithium Power Station (LiFePo4) made by RELiON Battery this spring and summer. The batteries from this company are one of the most long-lasting and reliable energy sources on the market, powering anything including camping, RVs, marine, industrial, commercial equipment and off- or on-grid power storage in your home, or as emergency power — without the unhealthful fumes and noise of a fuel-powered generator.

However, the Outlaw 1072s is also versatile and can also power the essentials while camping in an RV or tent, tailgating, hunting as well as during emergency outages as a backup power source. The portable unit supplies 921 watt-hours, equipped with 1,000 watts pure sine wave inverter capable of a 2000W peak surge. It has 3500-plus lifecycles, BMS voltage protections so you can power portable cooktops, mini-refrigerators and lights, recharge laptops and other electronic devices.

The front panel (1) on the unit features a large LCD screen which displays run time in and out so you always know how much power you are using and how much is remaining. One of the biggest advantages of the 328 unit is the wide range of power options including three USB Type A ports and two USB Type C Ports for charging smart phones and tablets on the front side.

The back side (2) also has two DC outputs along with a DC power button and two 120V wall outlets. Here you find a 12V car port, a quick charging port which can charge the unit in two to-three hours using the supplied charger capable of 30amps. It also has AC outlets, input DC charger port and AC power button.

The unit comes with a 10-amp charger, power cord, EC5 Plug, power adapters, power extension cable, and an MC4 Solar to DC Charger adapter for attachment to a solar panel. A hard case keeps them all together.

The solar adapter makes it easy to pair two solar panels up to 160W, 15-25 volts giving you the option to use the plugs for charging or using solar power and to re-charge batteries for the electric mowers.

The Outlaw 1072s unit is lightweight and is low maintenance. The portable power station has a sturdy top handle that makes it easy to grab and go making it a convenient backup power option in an emergency and for other situations. Unlike a generator, it is quiet and doesn’t release gas or fumes. It can be used to charge a variety of appliances, such as lamps, laptops, phones, small heaters, a radio, or television that you could have in your emergency kit.

The 1000W Lithium Power Station (LiFePo4) sells for $1099.95. Order it online with free shipping at https://www.relionbattery.com/outlaw-1072s. RELiON also has full home battery options for off and on-grid storage offering total assurance that you will have power when the grid goes down. Learn more at www.relionbattery.com.
Why is this a breakthrough?

Sunlight covers a broad range of wavelengths on the electromagnetic spectrum; traditional silicon solar cells readily capture shorter wavelength photons that have more energy than those with longer wavelengths. 1 Sunlight is bright enough (between 1,000 and 100,000 lux) so that silicon cells can harvest significant energy; ambient (typical indoor room) light is dimmer, however, between 50-100 lux, so photoelectric cells must harvest energy from a broader array of wavelengths to be effective, including LED, fluorescent, incandescent and diffuse natural light.

What does dye have to do with it?

Dye-sensitized solar cells (DSSC) use materials such as titanium dioxide to generate power. Titanium dioxide on its own does not readily absorb light, so it must be coated or “doped” with darker colored dye to capture the photons. 2 The electrons in the dye, excited by the photons, move through the titanium dioxide layer (the photo-anode) providing electromotive force. Meanwhile, electrons return to the electrolyte via the counter electrode replacing the electrons that left the dye/titanium dioxide layer, completing the circuit.

The explanation of how and why solar cells work is beyond the scope of this article, involving among other things the movement of electrons and “holes” through transistor and electrolyte materials. DSSCs were first developed in the 1980s but had limited life and power output. Ambient Photonics describes the secret ingredient (their intellectual property) that allows them to solve the dilemma:

“The Ambient team has developed more than 40 novel, organic sensitizer molecules used to create groundbreaking proprietary dyes tuned for low light conditions which absorb light across the entire visible electromagnetic spectrum for the highest possible efficiencies.” 3

Ambient claims that its low-light technology, harvesting energy from across the light spectrum, generates as much as three times more power than previous technologies.

What is the significance of a green energy perspective?

As Ambient Photonics points out in their Technology Overview, German battery manufacturer Varta estimates that a triple-A battery has a lifetime greenhouse gas (GHG) emission equivalent of 61 grams of CO2. Most remotes require two such batteries with approximately a one-year lifetime. If each remote has a lifetime of seven years, and about 225 million TV sets are shipped each year, the annual CO2 equivalent avoidance would be 192,150 metric tons. Statista estimates that there are 1.72 billion TV households worldwide, estimated to exceed 1.8 billion by 2026. Note that in the U.S. it is estimated that there are about 2.9 TV sets per household, so this is a growing issue.

AAA BATTERY CO2 EQUIVALENT

Another real-world example of the use of low-light PV cells is Ambient’s partnership with E Ink to co-develop next-generation electronic shelf labels (ESLs) used in brick-and-mortar stores. Today’s ESLs are read-only price tags that help retailers avoid the hassle of managing paper tags, but the small batteries inside these ESLs limit retailers to only a handful of daily pricing updates and constrain ESL functionality. With low-light PV cells, ESLs can become battery-free, connected devices with expanded functionality that eliminate the operational expense and design constraints of batteries with fixed power.

With Ambient’s PV cells, ESLs will transform into connected sensors that generate dynamic customer data from the physical retail environment, enabling smarter merchandising decisions that drive sales and improve consumer experience.

Bates Marshall, CEO and Co-founder of Ambient Photonics said, “... as electronic shelf labels begin to see broader adoption, the impact of millions of discarded batteries is increasing. Our partnership with E Ink will reduce this environmental impact, while enabling a new breed of dynamic retail displays that businesses will utilize to optimize the retail experience without generating toxic battery e-waste.”

1Max Plank and Albert Einstein explained why shorter wavelength light contains more energy in the early 1900s, as part of the understanding of light’s behavior as both a particle and a wave.

2This is not the first time synthetic dyes have played a role in technology development. Major chemical companies including BASF, Bayer, ICI, Ciba-Geigy and IG Farben (“farben” = “colors” in German) got their starts developing dyes for the textile industry.

3From Ambient Photonics Technology Overview

After a career in data product management, Martin Wahl has worked in biofuels since 2006, currently with Lee Enterprises Consulting, a large bio-economy consulting group. Dividing his time between California and New Hampshire, he serves on the California State Senate Appropriations Committe and is a Newfound Lake Region Association member.

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Sun Day Campaign, August 8, 2023

Based on a review by the SUN DAY Campaign of data newly released by the Federal Energy Regulatory Commission (FERC), utility-scale solar and wind provided the majority of new U.S. electricity-generating capacity added in the first half of 2023.

In its latest monthly "Energy Infrastructure Update" report (with data through June 30, 2023) FERC reports that of the 17,017-MW of new generating capacity placed in service during the first half of 2023, 5,867-MW (34.48%) came from solar and another 2,750-MW (16.16%) from wind for a combined total of 50.64%. Including new capacity from hydropower (254-MW), geothermal (44-MW), and biomass (30-MW), the mix of renewables accounted for 52.57% of the new generation added. Most of the balance came from 8,025-MW of natural gas (47.16%). The rest was comprised of 16-MW of new oil capacity and 31-MW of waste heat.

The new solar capacity added between January and June was more than that for the first half of any prior year reported by FERC. Utility-scale solar is now 6.97% of total available installed generating capacity. Wind is another 11.62%. Taken together, the mix of all renewables now accounts for 48.06% of the total. A year earlier, it was 26.74% while five years ago it was 20.67%. Thus, renewables are adding about 1.5% each year to their percentage share of the nation’s generating capacity. And that growth may be accelerating.

Over the next three years (i.e., by June 2026), FERC anticipates "high probability additions" of solar to provide another 81,284-MW while wind is expected to expand by 19,734-MW. Assuming that materializes, in three years, solar and wind combined would provide over a quarter (26.01%) of U.S. generating capacity. Wind would account for 12.41% of installed capacity while utility-scale solar would provide another 12.60%. That is, installed solar capacity is poised to overtake that of wind within three years, making it the largest renewable source by capacity. And that does not include generating capacity provided by small-scale, distributed (e.g., rooftop) solar. [1]

Factoring in FERC’s forecasts for hydropower, geothermal, and biomass, renewable energy sources would expand from today’s 28.06% of installed generating capacity to 33.99% - i.e., over a third - by June 2026. For perspective, utility-scale solar’s share of U.S. generating capacity by June 2026 could be more than four times that of oil (2.68%), substantially greater than that of nuclear power (7.38%), and nearly equal to that of coal (13.95%). [2]

Solar and wind’s share of U.S. generating capacity could actually be substantially higher if new capacity exceeds FERC’s forecast of "high probability additions." The agency indicates that the amount of solar and wind in the three-year pipeline could be nearly three times higher than the total of the "high probability additions". Solar could add 214,563-MW while wind could grow by 66,286-MW.

Moreover, recent history suggests that solar and wind growth is outpacing FERC’s predictions for "high probability additions." A year ago, FERC forecast "high-probability additions" for wind and solar within three years of 17,225-MW and 66,315-MW respectively. FERC’s latest 3-year outlook for those sources is now more than a fifth (20.9%) higher.

Meanwhile, if just FERC’s "high probability" forecasts materialize, by June 2026, installed U.S. fossil fuelshare of total capacity will drop significantly: natural gas - 41.65% (from 44.41% in June 2023), coal - 13.95% (from 16.43%), and oil - 2.68% (from 2.87%). Nuclear power will also fall from 8.06% today to 7.58% in June 2026. "Solar and wind combined continue to add more new capacity to the nation’s electrical generating mix than any other energy source," noted the SUN DAY Campaign’s executive director Ken Bossong. “Within three years, they will each account for over an eighth of U.S. generating capacity while the combination of all renewable sources will be over a third.”

Source links and notes can be found at: www.ferc.gov/media/energy-infrastructure-update-june-2023. For the information cited in this update, see the tables entitled "New Generation In-Service (New Build and Expansion)," "Total Available Generation Capacity," and "Generation Capacity Additions and Retirements."

The SUN DAY Campaign is a non-profit research and educational organization founded in 1992 to support a rapid transition to 100% reliance on sustainable energy technologies as a cost-effective alternative to nuclear power and fossil fuels and as a solution to climate change.

A Tale of an Off the Grid Solar Home

Larry Plesent

Tipi living is not conducive to keeping a straight job. And after four plus years of living in one, even a large well-appointed one sited on a large deck in the woods, we knew it was time to build a more permanent home. We built a small log house, warm and tight. It is heated almost entirely with wood harvested from our property. A Defiant wood stove stands near the center of the house, and a rebuilt 1929 Glenwood cook stove holds court in the kitchen. A rarely used gas heater is there for back up when we go away for a bit. The house was built with twelve 110W Mitsubishi panels which cost $21,000 in 2009. We upgraded the solar this year, replacing the second round of golf cart batteries with a 45kwh lithium-ion battery from Iron Edison. By adjusting its parameters to not over nor undercharge, we expect this battery to last for over forty years. In 2023, every part of the off-grid solar was replaced making the solar array 250%. The cost was $22,000. This off-grid solar system is 250% MORE for about the same price as the original panels! It helps to be friends with a retired electrical engineer (thanks Neil) to help keep labor cost down, but the math is still real.

The upgraded off-grid solar array has eight 400 watt Q cells. What a difference! The solar controller and inverter both were replaced as part of the upgrade. At a time when inflation is rampant, the cost of residential solar power continues to drop. At least for now, it’s still a great time to go solar.

Is it all peaches and cream? All the time living in our off-grid world? We all create our own attitudes towards things, don’t we? You must enjoy a bit of challenge and want to live and think outside of the comfortable grid-tied life to be unhooked. When something stops working around here, I’m the utility company. I think it’s written in the marriage vows.

Utility chores include cleaning off the panels after snow. I use a simple light plastic snow shovel or a broom to remove snow from the eave mounted array. I call them eaves because that’s what they are. Rather than roof mounting the panels, eaves allow you the option of cleaning them off, dramatically increasing productivity. It doesn’t take much. Most of the time the snow slides right off. And the reflection from ground snow is a multiplier.

Another winter chore is maintaining the back-up generator. This does not have to be a gigantic machine. You are trickle charging your batteries, which powers your house. I use a suitcase size Honda type generator. The current one happens to come from Harbor Freight at a greatly reduced price. Use synthetic oil. This is not the time to be cheap. You will thank me for it later.

Daily attitude changes from living off grid include becoming more conserva-tive in overall energy use. You have to when living grid unplugged. Teenagers seem to have a particularly hard time with this. Laundry and recharging the electric mower are often done early in the day to allow the panels to top off the battery. Other folks seldom time their household chores, but it becomes routine. Once those things are taken care of the extra sunshine can put its extra electrons into the car.

In general, you develop an awareness of your energy system and household energy use beyond what most of your neighbors consider healthy behavior. And maybe that’s a good thing.

I am not an authorized financial advisor. But I have seen the 5%, 20-year return Vermont Soap in Middlebury, VT got on their investment of solar panels. Another way to look at it is that the 10-year note to purchase the system is paid off by the electricity it produces over 10 to11 years. Everything after that is FREE POWER. BABY. Results will vary.

Green is a process, not a result. Life is a process of resisting entropy. I fully encourage you to follow your dreams to learn how to design and construct your own green home and business, on- or off-grid. Happy building!

Larry Plesent is the founder of Vermont Soap and is a writer and natural products formulator residing in the green hills of Vermont. Read more from Larry’s work at www.reactivebody.org. ☞
We Don’t Need as Much Energy as We Thought

George Harvey

It turns out that if we switch to renewable energy, we may be able to live pretty much the way we do while using a good deal less energy. This is important, and it implies that the switch to renewable energy could happen much faster than many people realize.


We start with an energy flow diagram, “Estimated U.S. Energy Consumption in 2021.” This is the most recent such diagram from Lawrence Livermore National Laboratory, and it is the diagram Barnard used. On the left side of the diagram, there are nine primary sources of energy. From the top, they are solar, nuclear, hydro, wind, geothermal, natural gas, coal, biomass, and petroleum.

Solar, wind, and hydro power all originate as electricity directly. There may be energy lost in conversion and transmission, but the amounts are relatively small. By contrast, thermal power sources, including baseload power plants and internal combustion engines, lose a lot of energy. For power plants using coal, natural gas, or atomic fuel, the amount of energy lost is energy services, and the light gray are two gray boxes. The dark gray one combustion engines is worse. The post “Where the Energy Goes: Gasoline Vehicles,” at fueleconomy.gov states, “Only about 12% to 30% of the energy from the fuel you put in a conventional vehicle is used to move it down the road,” (https://bit.ly/auto-energy).

On the right side of the diagram, there are two gray boxes. The dark gray one is energy services, and the light gray one is rejected energy. Energy services represent the energy we actually use, and rejected energy is the energy that is lost, mostly as heat. Please note that the amount of rejected energy is waste, and the greatest part of that loss results from using fuel. Regardless of whether it is some fossil fuel or nuclear power, the process is that fuel produces heat, and the heat is used to make energy. The energy conversions associated with fuel use have no equivalent at solar, wind, or hydro plants. Even when renewable energy is stored in batteries, the inefficiencies involved are small by comparison to those of fuel use.

Now we get to what Michael Barnard calls “the primary energy fallacy.” The fallacy is the belief that we must replace all of them with about half of the energy we could replace them with about half of the energy we could.
SODIUM–ION AND IRON–AIR BATTERIES: A NEW ERA IN BATTERY TECHNOLOGY IS EMERGING

Roy Morrison

There are two common objections to a 100% renewable energy transition. First, that renewable energy is intermittent. The sun does not always shine, and the wind doesn’t always blow. The pro-nuclear and anti-renewable crowd claims we are forced to continue to rely on large based load energy plants to supply large portion of electric supply. Second, that storage systems to deal with intermittency must rely on lithium batteries whose mining and refining is ecologically damaging sand whose supply is politically insecure. And further lithium batteries require cobalt, a heavy metal often mined under horrendous working conditions in ecologically destructive ways.

What is the true story?

First, forty years of good hourly wind and solar data globally has made clear that over continental scale areas a mixture of renewable sources can supply 100% renewable power with minimal storage. Good online analytic tools from CleanTechnica are available to model the amount of wind, solar, and storage in a given area to provide 100% renewable energy and predict the price (https://bt.ly/cleantechnica-renewable-energy-calculator).

Second, the development of new storage technologies is rapidly being commercialized in large scale and coming to market in 2023 in the case of sodium-ion batteries, and in 2024 for iron-air batteries. The technologies are different. Sodium-ion is focused on portable batteries typically for electric cars. Sodium-ion batteries have been developed by CATL in China, the world’s largest battery company. Sodium-ion is much cheaper than lithium, safer, and longer lasting. It is less energy-dense than lithium and, therefore, heavier which matters if you want elite performance but works fine in your electric vehicle (EV). Sodium-ion batteries are being installed in 2023 EVs. Moreover, a disease version two will hit the market shortly. Iron-air batteries using just iron, air and water from Form Energy from Somerville, MA, developed by MIT scientists, are for stationary storage. Weight is of little concern for storage at solar and wind farms. The basic operation is similar to early battery development but re-designed for twenty-first century needs. Energy flows from the anode through a conducting water-based fluid to the cathode. The Form Energy innovation is reversible rusting. Discharging the battery takes oxygen from the air and converts iron metal to rust. Charging with an electric current turns rust back to iron and releases oxygen.

The iron-air battery cycle operation. (Form Energy)

The era of large base load plants is ending.

The future will be millions of points of renewable energy and millions of points of storage. Already there are virtual power plants combining thousands of small rooftop systems with storage that can be dispatched to meet utility needs. The many millions of electric vehicles will also provide enormous storage resources. There is no place for a base load plan that pushes expensive nuclear fuel to operate 24/7. The 100-hour storage from Form Energy’s iron-air battery will be a small fraction of the price of lithium batteries and further crush the economics of expensive fossil fuel and nuke power. Flow batteries like the Form Energy iron-air batteries use iron and air and water electrolyte. Solar and wind have zero fuel costs.

Storage and renewable generation will be dispatched based on price and demand. There will simply not be price takers for high-priced nuke power beyond people who are simply signing long-term fixed-price contracts. They can plan all they want, but there will be no need for new nukes. But the market will have zero taste for that.


THE SMALL NUKE SCAM IS NOT HAPPENING

Roy Morrison

It’s important to understand that the hype about future allegedly small nuclear energy is both nothing of the kind and further reasons why they are almost certainly continuing to be uneconomic and slow to build.

The original designs for various types of next-generation nukes were in the 50- to 70-megawatt (MW) size. The argument that these 50MW more-or-less new nukes compared to 1,000 MW to 1,1,00 MW would be able to be inherently safe, about to be installed almost anywhere, factory mass-produced and standardized and dropped down in big cities and to industrial plants.

That is not happening.

The 60MW NuScale Power Corporation (https://www.nuscalepower.com/en), design now plans its first plant to be 345MW or over six NuScale reactors on a single site, about 1/3 capacity of 1,000MW nuclear. What this means is controlling and connecting five or six reactors at the same site which adds all sorts of design, piping, and control problems. Quite the opposite of factory built standardized design. Anyone who has worked around power plants with multiple units (whether nuclear, fossil fuel or renewable) knows that multiple units mean all kinds of site-specific problems. I was a founding member of the University of New Hampshire (UNH) energy office in the 1980’s. UNH had a central boiler plant with two venerable boilers burning sludgey bunker oil which by their nature needed careful attention, evidenced by the blast doors on top of the boilers where on occasion control and sensor problems led to a small explosion that would lift the heavy blast doors into the air with little or no damage to the boiler. The university then added a commercial incinerator using the municipal waste stream to generate power in an adjacent building. It never worked well. It frequently did not reach necessary temperature to combust the fuel properly and showered dark crap on the university. It was scrapped after a few years. I suspect that the early generations of multiple reactor units will be expensive to build and operate, and unless endlessly subsidized will be too expensive to run. Security and safety requirements mean that new nukes must be large enough to even dream of being cost-effective. And add nuclear waste to the mixture and costs will continue to skyrocket.

The development of distributed solar with storage is already leading to the development of Virtual Power Plants (VPPs) where large numbers of rooftop solar systems with battery storage and commercial systems are electronically linked to be dispatched by utilities to help meet peak energy needs. CPower is 2023 national VPP leader with 6.3 gigawatts available from 17,000 sites. The VPPs are becoming the basis for another income stream for rooftop solar with commercial and residential customers who receive a portion of VPP revenue. Similarly, the millions of EVs with batteries when designed with two way charging and discharge will prove an enormous potential amount to energy storage. A small percentage of EVs can be an enormous storage resource. California is debating a law that will require EV buyers to make sure EVs are able to feed battery power into the grid. New battery systems to come include solid state battery technologies using solid electrodes and solid electrolytes. Volkswagen is working with QuantumScape, a Stanford University spin-off. The goal is a commercial scale solid state battery for Volkswagen in 2025. CATYL is working on a light, very energy-dense battery system design to replace jet fuel to power aircraft. The combination of zero fuel cost renewables with growing amounts of energy storage means a fundamental transformation in the nature and management of the electric grid. The era of base load power plants is coming to a close. Base load plants using fossil fuel or nuclear energy will be unable to compete with renewables. The renewable energy system will be based on millions of decentralized points of generation and storage. The role of utilities in the twenty-first century will be to optimize this grid and make money doing it effectively. The renewable transformation is accelerating.

When this reporter was a kid, a marvelous machine lived under our kitchen sink. It roared and whirled and gobbled food scraps with the added thrill of being just frightening enough to munch your fingers off if given the chance. For a suburban family that had never heard of composting, the garbage disposal was a great way to keep slimy organic scraps out of the wastebasket. Instead, the slurry went to the septic tank to make a gazillion microbes very happy.

In an innovative pilot project, the New York City Department of Environmental Protection (DEP) is using this basic combination of sludge plus food waste on a mega-scale at its Newtown Creek wastewater treatment plant which processes 310 million gallons of sewage every day. The goal is to produce clean energy, slash greenhouse gas emissions, divert food waste from landfills and generate revenue.

One of the major concerns of wastewater treatment plants using anaerobic digesters is the production of methane gas which has 86 times more global warming potential than carbon dioxide. Newtown Creek and the 75 other wastewater treatment plants in NYC capture about 30% of the methane they generate for internal use, but the rest is simply flared off into the atmosphere — over 2.8 billion cubic feet per year.

Mainly to address this problem, the DEP conceived its "gas-to-grid" project at its Newtown Creek facility. A decade in the planning, the project was undertaken in partnership with the local gas utility National Grid and Waste Management. Food waste collected in NYC by Waste Management is added to the digesters to boost biogas production. Since the raw biogas is a mix of elements, it must be refined to extract the pure methane which can then be used exactly like fossil derived natural gas. It is referred to as Renewable Natural Gas (RNG). National Grid built the refining facility on site at Newtown Creek and pumps the RNG into its pipeline network, supplying over 5,000 homes.

Energy Vision is a New York-based national environmental non-profit committed to researching and promoting the clean energy strategies and solutions necessary for a sustainable future. They recognized the enormous potential for this model to help NYC and NY State meet the 2050 climate goals of COP 26 while also furthering Mayor Adams recently announced goal to divert 100% of the City's food and green wastes from landfills. They produced an independent report "Gotham Goes Green" assessing the benefits of applying the Newtown Creek model to all 76 of NYC's treatment plants.

Matt Tomich, Energy Vision President and principal author of the report, said of its origins and purpose, "Central to our mission is to promote strategies that can advance and enable the shift to a sustainable energy future through research, education and outreach. Toward that goal, we've spent a lot of time looking at organic waste streams and opportunities to capture and mitigate methane emissions." To understand why the Newtown Creek energy vision of doing more projects like this - cost-efficient, energy-efficient, and considering broader sustainability impacts. We are proud to have played a role in its success."

The Efficiency Vermont Small New Construction Best in the State award recognizes buildings that have achieved exceptional energy performance through the use of innovative design and construction practices.

Vermont Green Building Network's Vermont's Greenest Building Awards recognize exemplary residential and commercial buildings that excel in green building strategies - including water, health, transportation, and affordability - and meet the highest standard of demonstrated energy performance.

Vermont Green Building Network's VT's Greenest Building Award goes to TVT! This exemplary building excels in green building strategies and meets the highest standards of demonstrated energy performance including: water, health, transportation, affordability as well as many other details built into the design.
The Climate Crisis is Here but Climate Optimism is Important

Jonathan Dowds

Despite the historic flooding that has had a serious impact on so many families, towns, and businesses this summer, when it comes to climate change, optimism - and action - are the orders of the day. We know that every solar panel that goes up on a roof or field in Vermont reduces the use of fossil fuels. We know that the incremental steps we have already tak- en are beginning to have big impacts. And we know that the Inflation Reduction Act and continually improving technologies have opened the door for a vastly faster renewable energy transition than seemed possible even a few short years ago. The path to replacing fossil fuels with renewable energy has never been clearer and more achievable.

One example of the power of renew- ables to reduce fossil fuel use comes from a source that may seem improbable to many people—solar power's increasing contribution to our grid's winter reliability. In recent years, ISO New England—the organization responsible for ensuring the reliability of the region's grid—has repeatedly shown that a very cold winter could result in "controlled power outages" because the natural gas pipeline that delivers gas to New England is not capable of meeting the region's energy needs when heating demand is at its highest. But the growth of solar is changing that and, even with the planned retirement of one of New England's largest natural gas plants, the forecast for the next two winters is much rosier.

While solar makes most people think of sunny summer days, the reality is that solar can and does continue generating electricity throughout the winter. Even with power outages shorter, snowier days, winter solar production is now enough to largely alleviate the risk of energy shortfalls from our dependence on an unreliable natural gas system. After years of crossing their fingers that tempera- tures don't drop too low for solar power, ISO New England reported for the very first time that the accelerating growth of solar energy along with the continued success of efficiency measures and the first offshore wind facilities coming online is taking the region out of the danger zone. But while we should celebrate solar generation reaching levels that solar power can increase winter reliability, we will need dramatically more renewable energy to finally shut down New England's natural gas plants that continue to pollute our climate.

There are reasons for optimism here as well.

Over the last ten years, the cost of solar panels and batteries has dropped by 80% while wind costs have dropped by close to 60%. In 2022 alone, close to 75% of the new generating capacity built in the US was wind and solar. So far in 2023, the U.S. has generated more power with wind and solar than it has with coal. With significant new tax incentives in the Infla- tion Reduction Act, the cost of solar projects have skyrocketed. And this isn't just happening in places like California and Texas. Maine added 170 MW of solar in 2022 and Massachusetts added 335 MW of solar and began construction of an 800 MW offshore wind project slated to come online this year.

Vermont's communities— even accounting for our small population—were much more modest, a mere 34 MW of solar in all. On a per capita basis, this is less than 4% of the new solar capacity being built in Maine. And wind energy, which is playing a critical role in the climate plans of states like Maine, Massachusetts, and Rhode Island, is nowhere on the horizon in Vermont. This is where our optimism must be merged with action.

The biggest barriers to building more solar, and more wind for that matter, in Vermont are not technical, they are economic, and they are not environmen- tal. The biggest barriers to building wind and solar are political and regulatory. During the Scott administration's tenure, the process for permitting renewable projects has been increasingly unclear, unworkable, and ineffective and the state's Renew- able Energy Standard, which dictates how much renewable energy the state's utilities must purchase, has never been updated. We have gone from being a regional, and even national, leader in renewable energy to a laggard.

Unlike the quest to build a better, cheaper solar panel, which most Ver- monters cannot influence, the regulatory and political barriers that are blocking our transition to renewable energy are squarely within Vermonters' control. And this is the biggest reason for optimism of all.

Jonathan Dowds is Deputy Director at Renewable Energy Vermont.

Community Power in New Hampshire—The Savings Are Real

Andrew Spooner

Over the last few years, energy cost has never been more prominent in many New Hampshire household budgets. The price of energy has been high, and the peaks have been extreme. Many communi- ties have been seeking new ways to have more control over their options for electricity purchasing but have had few ways to be involved in this process for a long time.

That changed in March with the launch of The Community Power Coalition of New Hampshire (CPCNH). CPCNH is a grassroots non-profit power agency enabled by legislation in 2019 and made possible by a combination of local and state leadership. "We are finally realizing the fruits of the hard work we put in over the last three years," said Clifton Below, one of the originating forces behind the coalition and now its Board chair. "Our goal is to put the power of making energy choices in the communities where it belongs."

The Coalition allows for greater flexi- bility and control for their member communities, giving them to be nimble and counter future market volatility while investing in projects that will have a positive impact. At its core, CPCNH is designed to solve the problems of bringing inno- vative solutions, ratepayer savings, and increased community decision making. CPCNH is led by a Board of Directors that consists of individuals appointed by

the member communities, and together they use their collective buying power to lower electricity rates for customers, offer more choices for cleaner energy supply, and provide local decision-makers and communities more control over their energy choices.

The first wave of communities imple- menting community power included Enfield, Exeter, Hanover, Haverhill, Lebanon, Nashua, Peterborough, Plain- field, Rye, and Walpole. Portsmouth and Canterbury launched soon after the first ten, bringing the number of operational CPCNH community power programs to twelve.

These communities saw immediate rate reductions that represented 22%, 28%, and 39% savings relative to Eversource, Liberty Utilities, and Unilite rates, respec- tively. Altogether, they experienced $3.8 million in savings for their electric customers, including over $2 million for Nashua customers in the first three months. "Nashua is proud to be among the first ten communities that are charting a new path when it comes to where we get our energy," said Nashua Mayor Jim Donchess.

“Community Power Coalitions in and around communities the ability to control price volatility in the short- and long-term, and the tools to accelerate the transition to a more economically and envi- ronmentally sustainable energy system. I'm pleased that this new endeavor will help many Nashuans save money on their energy costs.”

CPCNH has just announced that it will continue to provide rate savings to its communities when in August, the base rates for CPCNH communities will fall to 10.9¢ per kilowatt-hour, the lowest known available rate in the state. This second consecutive rate reduction will generate an additional $5.5 million in sav- ings for community customers and $1.7 million in community financial reserves. Most exciting, the Coalition can offer their customers more choices, including plans that feature 100% and 39% renewable energy rates comparable to the default utility rates.

Under the community power model, community customers still receive their bills directly from utility companies, who will continue to deliver the power, maintain the grid, and handle billing. The Coalition helps control the electrical sup-

ply portion, which has saved their customers millions of dollars since their launch earlier this year.

The success of community power has sparked growing interest among commu- nities, and the Coalition membership has now grown from the original fourteen to 35 cities, towns, and counties. The Coalition membership now represents more than 24% of NH's population and will continue to grow as additional communi- ties join.

CPCNH is built for long-term success, with a team of experts and municipal of- ficers working together in order to bring the greatest benefit to their members. In April they hired their first CEO, Brian Callinan, who has over twenty years of experience in the electric utility indus- try and previously managed the New Hampshire Electric Cooperative's power resource portfolio strategy. "We are looking forward to the opportunity to help deliver ratepayer savings throughout New Hampshire," said Brian Callinan. "CPCNH is providing the tools to help accelerate the transition to a more economic and envi- ronmentally sustainable energy system for cities and towns in New Hampshire.” Communities interested in joining the coalition should email info@cpcnh.org or visit cpcnh.org to learn more about the process. All New Hampshire cities, towns, and counties can join the alliance at no cost.

Andrew Spooner is a principal at b-fresh consulting.
Renewable Investors Perceive U.S. Market Increasing in Attractiveness

ACORE Analysis Tracks Company Expectations for Renewable Finance Through 2026

An analysis released on June 7 by the American Council on Renewable Energy (ACORE) assesses how the Inflation Reduction Act (IRA) is impacting the near- and mid-term outlooks of some of the most prominent investors and developers in the renewable energy sector. The report, “Expectations for Renewable Energy Finance in 2023-2026,” also presents survey results addressing the headwinds currently hindering the rate of clean energy development and the potential impacts of new and different financing structures, such as transferable tax credits, on the market over the next three years.

“America has never been a more attractive venue for renewable energy investment than it is today, thanks largely to the policy certainty provided by the IRA,” said ACORE President and CEO Gregory Wetstone. “Even as tremendous opportunity awaits, there are still serious market challenges that must be resolved to realize the potential of the IRA and achieve the Biden administration’s goal of power sector decarbonization by 2035.”

While many of the same headwinds that existed before the IRA’s enactment (grid-related issues, supply chain challenges, trade restrictions, tax equity constraints) continue to impact renewable energy developers and investors, the new analysis finds the IRA has already increased companies’ participation in the renewable energy market in 2023. All surveyed developers and most investors said they plan to increase their activity in the U.S. renewable energy sector compared to last year, with 84% of investors planning to increase their U.S. renewable energy investment by 5% or more.

Additional survey findings were as follows.

- For the first time in the six years ACORE has conducted investor surveys, investors unanimously expect the U.S. to increase in attractiveness for renewable energy investment in 2023-2026 compared to other countries.
- Most investors (83%) expect the attractiveness of renewable energy investment to moderately or significantly increase compared to other asset classes in their portfolios in 2023-2026. None of the investors surveyed expect the attractiveness of renewable energy to decrease.
- Survey respondents commented that headwinds such as supply chain constraints, trade restrictions, interconnection queue delays, and insufficient transmission capacity create significant risk challenges that can lead to delays in deal flow, longer lead times, and increased project costs. One-third of developers have reduced their risk profiles in 2023. However, most large developers and many investors are willing to take on increased risks.
- More than one-third of investors and developers expect a decrease in tax equity accessibility this year, but of the surveyed investors who specifically invest in tax equity, 45% expect to see an increase this year compared to 2022.
- Over 80% of surveyed investors plan to utilize tax credit transferability or direct pay.
- Survey participants agree that the tax equity market must nearly triple in size (from $18-20 billion annually to over $50 billion) to meet heightened post-IRA demand.

Recent attempts to limit ESG investment have affected one-third of investors and developers.

Over 90% of surveyed investors and developers prioritize low-to-modern income or energy communities (as defined by the IRA) to some extent in their renewable investment or development decisions.

For the second year in a row, investors ranked utility-scale solar, energy storage, and commercial solar as the top three most attractive clean energy sectors for investment over 2023-2026. PJM, MISO, ERCOT, and CAISO were selected as the top power markets for renewable energy investment and development in 2023-2026.

Many survey respondents reported plans to participate in domestic efforts to expand clean energy manufacturing. More than one-third of investors (38%) plan to invest in domestic clean energy manufacturing facilities in the U.S. Twenty-eight percent of developers report plans to open a new manufacturing plant, and 33% plan to incentivize their suppliers to open domestic facilities.

The report (https://acore.org/Re-finance-2023-2026/) concludes with the policy reforms and market drivers that ACORE is pursuing this year to accelerate renewable energy growth, maximize the impact of the IRA, and reduce the effect of sector headwinds.

Solar Energy Increases the Value of Your Home

Ben Joslin

The benefits of installing a solar array include energy cost savings, a positive environmental impact, and renewable energy tax incentives and rebates. But did you know solar can also have a huge impact on your home’s value? In today’s highly competitive and expensive housing market, solar energy can add value and increase the selling price of a home. Buyers are ever more focused on sustainability and are increasingly prioritizing energy efficiency when evaluating a home purchase. Most buyers view solar as a major home enhancement.

The Financial Advantages of Solar

Houses with solar – either rooftop or ground-mounted – have a significant market premium. According to a study done by Zillow in 2019, houses with solar installations sell for an average of 4.1% more than those without solar. These findings were confirmed in a 2022 study published in the Journal of Management in Engineering.

These benefits can increase depending on your location. A study done by national home appraising experts in Washington, D.C. found that solar-powered houses in the D.C. area sold for 7.7% more than those without. Another recent study published in the Journal of European Real Estate Research further supports the added home value benefits, stating “valuation experts further validate the positive influence that on-site energy production has on property valuation.”

Many homes equipped with solar have little to no electricity costs, so the added benefit of disclosing a very low electric utility cost can absolutely help sell your house. This is particularly true in states like Massachusetts, where residents pay 25% more in electricity costs than the national average. Massachusetts also boasts some of the best incentive programs in the nation, like the SMART Program, and various other tax credits for residential solar adopters, making solar more affordable and appealing for potential home buyers.

Houses with solar installations sell for an average of 4.1% more than those without solar. (ReVision Energy)

Solar Outshines Other Renewable Infrastructures

Did you ever wonder why other forms of renewable energy infrastructure do not enjoy these same advantages? After all, wind turbines, high-efficiency HVAC systems, and other “green” home additions seem like viable options.

The answer is simple: none of these systems have been proven to consistently increase home value like solar photovoltaic (PV) installations.

According to a meta-analysis study published in Energy Research & Social Science, solar installations are “the only energy infrastructure associated with consistently positive property value increases.”

Solar electric power is a smart investment that pays off not only in energy savings but also increases your home’s worth.

In addition to reducing your carbon footprint, harnessing energy from the sun is a powerful investment for immediate electricity bill savings and for your future home sale.

Ben Joslin works at ReVision Energy. He studied business at Thiel College and enjoys researching and writing about renewable energy. Joslin lives in Maine, where he and his family have invested in a solar farm, cutting their energy consumption significantly.

FEDERAL

FEDERAL INVESTMENT TAX CREDIT
- To learn more about federal tax credits for home owners, home builders, and commercial buildings, go to hivewww. energystar.gov/about/federal_tax_credits.
- Learn more about electricity rebates and tax credits as associated with the inflation reduction Act at https://www.rewirin- gamerica.org/app/ira-calcator.

USDA RURAL DEVELOPMENT PROGRAM
USDA Rural Development Program - Rural Energy for America (REAP)
- To see the USDA programs and services available in your state, visit https://www.rd.usda.gov/services/all-programs.

Biorefinery Renewable Chemical, and Biobased Product Manufacturing Assistance Program
This program provides loan guarantees up to $250 million to assist in the development, construction, and retrofitting of new and emerging technologies. These technologies are: advanced biofuels, renewable chemicals and biobased products. For more information, visit https://bit.ly/usda_emerging-technologies_programs.

REGIONAL

The Grassroots Fund’s Grant Programs
The grant program is designed to energize and nurture long term civic engagement in local initiatives that create and maintain healthy, just, safe and environmentally sustainable communities.
Three grant programs are offered:
- Seed grants are designed to support new (often less than 1 year old) environmental projects.
- Grow grants support initiatives that look to deepen their work or broaden participation.
- The Young Leaders program supports efforts with significant leadership by organizers under 25 years old.
Learn more at https://grassrootsfund.org/grant-programs.

VERMONT

CLEAN ENERGY DEVELOPMENT FUND
The Small Scale RE Incentive Program, administered by Renewable Energy Resource Center (RERC), provides funds to help defray the costs of advanced wood pellet heating systems. Applications are being accepted through May 16, 2023.
All incentives are listed at: RERC-vt.org.

Advanced Wood Heating
Advanced Wood pellet heating systems -$300 per pellet boiler/furnace (in partnership with Efficiency Vermont). Commercial spaces over 5,000 sq. ft. may also be eligible for incentives. For the most updated information, see www.reerc-vt.org/ advanced-wood-heating-systems or call (877) 989-7372.
- Retail sales of “Advanced Wood Boilers” are exempt from Vermont’s 6% sales tax. http://tax.vt.gov/exemptions

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NEW HAMPSHIRE

Renewable Energy Incentives Offered Through the NH Department of Energy
NH DOE: All of NH DOE’s programs, save the Residential Solar Water Heating and Residential Solar/Wind Rebate Program Rebate Program are now OPEN.

Commercial Solar Rebate Program
Effective March 6, 2020, incentives are limited to 25% of the total project cost or $10,000 if less than the AC incentive payment otherwise calculated, whichever is less. The Program is available to non-residential structures with a commercial electric meter located in New Hampshire.
Incentive levels for PV systems are as follows:
- $0.20/watt (lower of AC and DC) for new solar electric facilities.
- Expansions to existing solar systems are not eligible.
- Incentive levels for solar thermal systems are as follows:
  - $0.12/rated or modeled kW/hr for new solar thermal facilities fifteen collectors in size or fewer; $0.07/rated or modeled kW/hr for new solar thermal facilities greater than fifteen collectors in size;
  - Expansions to existing solar systems are not eligible.

Residential Solar/Wind Rebate Program
Residential Solar/Wind Rebate Program, check NHDOE website.

Residential Solar Water Heating Rebate Program is currently closed.

Commercial Bulk Fuel-Fed Wood
& Pellet Central Heating Systems
- 40% of the heating appliance(s) and installation cost, up to a maximum of $65,000.
- Additional 30% up to a maximum $5,000 is available for thermal storage. Systems must be 2.5 million BTU or less. https://bit.ly/NH-DOE_Commer- cialIndustrialWoodPellet

Residential Wood Pellet Boiler/Furnace
- 40% of installed system up to $10k
- Maximum thermal efficiency and particulate emissions standards
Contact: https://bit.ly/NH-DOE_Residential- WoodPellet for more information and current program status.

LOCAL INCENTIVES
Many communities provide property tax exemptions for eligible projects. Check your town website for more information.
- 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.
- Information at www.energy.nh.gov/ energy-information.
- Plug-In Hybrid Electric Vehicles (PHEV), and $300 on Electric Motorcycles.

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 75% instant rebate for eligible weatherization improvements up to a $8,000.

- Visit www.NHSaves.com/HWES for more information and an online Home Heating Index calculator.

NH ENERGY STAR Homes
- Incentives for new homes which meet ENERGY STAR guidelines. Incentives include:
  - 75% federal tax credit available on all qualifying home improvements including, but not limited to, insulation, windows, and doors.

High Efficiency Heat Pump Incentives:
- $500 per ton, w/enhanced rebates up to $1,500 per ton; 2% financing available. (Commercial & Residential)

Business Programs
- Includes programs for: small and large business, new equipment and construction, seminars, lighting incentives, and catalog, and low and no interest funding programs.
- Visit www.NHSaves.com for more information.
Geothermal, the Underground Revolution

This could be the headline. Geothermal heat pumps are the best tool that environmentalists have to fight climate change. The technology works for residential, commercial and industrial buildings and can reduce emissions by 80%. Someday in the future, the heat rejected by a grocery store down the road could be recovered, stored underground and used to heat your home in the winter. Seemstupian, but consider that it’s already happening. Geothermal is experiencing an underground revolution and people like myself have dedicated our lives to making it even better.

Let’s start with some basics. Ground source heat pumps, commonly called geothermal heat pumps, are used to heat and cool buildings. A geothermal heat pump does not create heat, it moves heat from one place to another and can concentrate it into more useful forms using a refrigeration cycle. For instance, in the winter, a geothermal heat pump can move heat from the 50°F deep earth into the building at a temperature of upwards of 120°F. In the summer, it can operate in reverse, moving heat from inside the building into the earth, making the building cooler.

The refrigeration technology has been around for a long time; refrigerators, AC units and dehumidifiers all use a basic refrigeration cycle. What makes geothermal green is that 75-80% of the heat delivered will come from the ground. This high efficiency is why geothermal heat pumps have the lowest operating costs of any heating source in North America: about $ the cost of fuel oil used 24/7, rain or shine. The geothermal heat exchanger is typically a closed-loop plastic tube that is 300-600 ft deep, depending on the size of the building. The heat exchanger, the loops in the ground, are essentially giant thermal batteries that can run for months at a time and recharge on their own, for free. Making them is relatively easy, a qualified contractor can drill a hole and put the heat exchanger down. Alternatively, in some locations a heat exchanger can be laid horizontally under about 6 ft of soil. The horizontal method makes a bit of a mess to install, especially trenching it into the home, but grass will grow back within a few months and the heat exchanger is made of tough, HDPE pipe which lasts over 100 years. District loops can be formed by connecting geothermal loops together, which means that this technology works great in both urban and rural areas. In our experience though, anytime the buildings are a suburb distance away, it makes the most economic sense to use “1 hole per building.”

So does geothermal qualify as a silver bullet? Let’s think: high efficiency-check. Renewable energy? Check. Land use? Only used near buildings–check. Speed of Deployment? Well, it could probably be installed faster, but the technology is growing with innovative new systems that can retrofit to the home’s current system, so check.

Geothermal has several major advantages to its popular cousins, air source heat pumps. First, a geothermal system with 50°F water will be a lot more efficient than an air source heat pump drawing from the cold winter air. This is because the efficiency of all heat pumps decreases proportionally to the amount of temperature that has to be “lifted”. Second, because the earth’s temperature is stable below a few feet deep, geothermal will work in any weather. -50°F with crazy windchill? No problem at all. Last winter, the northeast got a 24 hour period of extreme cold and every one of our geo heat pumps worked great. We also got a few calls from folks in frozen homes that had air source who were looking to switch to geothermal!

Even though geothermal systems may cost upwards of $40,000, there are great incentives and financing options that bring the net cost way down and the ROI between 4-10 years.

Geothermal heat pumps are the best tool that environmentalists have to fight climate change. Every building converted is a vote for a sustainable future with the fewest big picture costs. Let’s make it happen together.

Matt Desmarais is the founder of Energy Catalyst, an Albany-based geothermal heat pump manufacturer and geothermal installer. Energy Catalyst operates primarily in NY and VT. He can be reached at matt@energycatalysttech.com or visit EnergyCatalyst.org.

SolarFest Adapts to Climate Change

July Festival Postponed; Events Rescheduled for October 28th

Mike Bailey

Bill McKibben is one of the greatest communicators of our time. In mid-July, when SolarFest had just been postponed, he wrote that, “I told you so are the four least satisfying words in the English language.” Our planet experienced an unprecedented number of catastrophic weather events in this week – huge flooding in Japan and India and China and Spain, but also in Montpelier and Ludlow and Barre and a dozen other places I know intimately. And this weekend, a second round of bucketing rainfall across the Green Mountains unleashed a landslide a half mile from my house.

Despite months of planning, and tens of thousands in unrecoverable costs, the safety of performers, speakers, sponsors, and attendees was paramount, so SolarFest23 was postponed due to climate change and volunteers instead responded to help...Cont’d on p.38
Jim Scherrer and Steve Krug

World Geothermal Energy Day

www.geothermalenergytimes.org 518.222.6567 August 2023

World Geothermal Energy Day is pleased to announce this year’s World Geothermal Energy Day to celebrate the people and achievements of geothermal energy and systems. The celebration will highlight noteworthy contributions of geothermal systems to society around the globe. On October 17th, we encourage all of you to give a shout out and a special acknowledgment to the stalwart people involved in the thousands of energy-efficient geothermal systems that keep providing reliable, resilient electricity, heat, and cooling to our essential facilities and homes. As the climate changes, and we turn towards net-zero carbon systems for our environment, geothermal offers tremendous advantages. This is the year to celebrate geothermal leaders, operators, and team members. It is safe to say that the world is changing. And though most people are not aware, energy-efficient geothermal systems are making people healthier by keeping our environment cleaner, sustainable, and resilient during everchanging times.

On October 17th, we will virtually highlight key geothermal projects and people internationally. Geothermal systems, play an important role in supporting carbon emissions reduction and electrification. Geothermal systems use the heat of the earth as an energy source, at high efficiency, to produce low or no-carbon energy. Generating electricity, heat and cooling using the earth’s stored energy translates into low or carbon-free energy. October 17th was selected to acknowledge a famous geothermal event on Pompei that occurred in the year 79 AD. Geothermal is represented by the power of Vesuvius. The residential, healthcare, offices, geothermal facilities, and the airwaves to teach us what is obvious — that there will be no future for us if we destroy the environment that sustains us. This one day helps us all to also pursue a “green recovery” in response to the challenges that confront us; showing that healthy energy supplies enable healthy environments.

Jim Scherrer and Steve Krug are the event coordinators for World Geothermal Energy Day.

GEOTHERMAL INCENTIVES

FEDERAL INCENTIVES

These can be stacked with the State incentives.

Residential - 30% tax credit (Form 5695 - https://bit.ly/Geo_incent_1)
Commercial - 30% tax credit + 10% bonus for domestic content + accelerated depreciation and other benefits.

Non-profits/government - 30% direct repayment + 10% bonus for domestic content.

High-Efficiency Electric Home Rebate Act (HEEEA) - (https://bit.ly/Geo_incent_2) - Up to $8,000 in total for income qualified homes + additional incentives for insulation and electric panel upgrades.

STATE INCENTIVES

New York - $1,500 per 10,000 BTU - (https://bit.ly/Geo_incent_3a) of capacity in most areas, including National Grid, paid as utility rebates
Con Edison Territory - $25,000 per building or $35,000 per building if in a disadvantaged community.

$5,000 State Tax credit (https://bit.ly/Geo_incent_4) - Up to $8,000 in total for income qualified homes
Commercial
- 0% interest loan up to $25,000 (https://bit.ly/Geo_incent_3)
Vermont - $2,100 per ton (12,000 BTU) (https://bit.ly/Geo_incent_6) through Efficiency Vermont

Massachusetts - $15,000 per home or $25,000 if income qualified (https://bit.ly/Geo_incent_7)
MassSave HEAT Loan
- 0% interest loan up to $25,000
New Hampshire Electric Coop
- members: $250/ton mail in rebate. Not payable to utility rebates
Con Edison Territory - $1,500 per 10,000 BTU - (https://bit.ly/Geo_incent_3)

MassSave HEAT Loan
- 0% interest loan up to $25,000
New Hampshire Electric Coop
- members: $250/ton mail in rebate. Not payable to utility rebates

Maine - 1/3 of the project costs up to $3,000 and up to $7,500 loan through Efficiency Maine

Ask About Our Rebates & Loan Programs

NHEC Heat Pump Programs

Heat pumps are up to 300% more efficient than conventional heat sources, which means you will spend less money each year heating & cooling your home or business.

Benefits of a Heat Pump:
- Save on your total energy bill
- Highly efficient
- Added comfort & convenience
- Heat and cool with one unit
- Room-to-room control
- Low maintenance

Are you ready to make comfort a priority?
Visit our website for more information: www.nhec.com/heat-pumps/
The NY HEAT Act Bill Is ‘Good For You’ – Assures Energy Affordability and Climate Action –

Anshul Gupta

Climate conversations often get mired in mindless money minutiae – how much will a certain climate policy cost and how will we pay for it – as if it were possible to put a price on civilization. But what if there were a policy with great impact that did not cost a dime, saved money from day one, and helped relieve energy burdens while leading to healthful homes and communities? Such Goldilocks policy options aren’t hypothetical; there’s one in front of New York State lawmakers right now – the New York Home Energy Affordable Transition or NY HEAT Act – a popular climate and energy affordability bill that deserves Governor Hochul’s immediate attention.

The NY HEAT Act will lower home energy bills for millions of New Yorkers by directing the state’s Public Service Commission to limit the average energy burdens of low-to-moderate income households to 6% of their earnings.

This bill, however, does a lot more than provide short-term relief from escalating home energy bills; it helps all gas customers of all incomes and protects existing natural gas customers from future price spirals.

Many New Yorkers are unaware that outdated state laws allow gas hookups worth thousands of dollars each to be given away at no or minimal cost to new customers. Existing customers are forced to pick up the tab that grows by about $200 million each year, raising everyone’s gas bills. Luring new customers with ratepayer funded free hookups adds tens of thousands of dekatherms of unnecessary gas demand, which increases upward pressure on supply prices. With the U.S. becoming the world’s largest exporter of liquefied natural gas, the era of cheap natural gas is over.

Dug up streets for old pipe replacement are more than a traffic nuisance; these will also add billions to utility bills. The new pipes laid at the cost of $6 million per mile will be mostly empty in just a few decades, but utility customers would be on the hook to continue paying for them for years after these are retired. Just like new hookups, our outdated laws allow the utilities a 9 to 10% return on these investments at ratepayer expense.

Whether these are service lines for new customers or replaced mains, these costs are added to utility bills based on an anticipated 60 to 80 years of service life that the new pipes will never see – heating and cooking with gas is not just going out of style, it will also be out of compliance with New York’s climate law by 2050. Without squeezing the cost-recovery into a couple of decades, which will dramatically increase the impact on gas bills, ratepayers could be on the hook to continue paying for decades after the pipes are retired.

There is even more trouble brewing for existing gas customers. As gas bills rise, awareness of gas stoves’ serious health harms grows, and heat pumps buoyed by federal and state incentives gain popularity, gas customers will increasingly make the switch to the superior electric alternatives. This will leave fewer customers to bear the growing costs of the gas distribution network. Bill hikes will cause more customers to defect, raising the costs for those whose circumstances prevent them from making the switch or the most ardent gas-stove aficionados who prefer not to switch, setting a feedback loop.

This is not just a hypothesis, but a conclusion that utility experts have arrived at after rigorous analysis. The NY HEAT Act has provisions for modernizing New York’s laws governing utility regulations to address each of these issues. Not surprisingly, the gas industry is busy fomenting opposition to utility reform among labor and business groups.

Last year, the state passed legislation backing utility thermal energy networks (UTENs) with strong labor support for highly energy- and cost-efficient district heating and cooling. Strategically replacing leak-prone pipes with thermal energy conduits would build lasting energy infrastructure and offers a path for many union workers with pipe skills to transition to a clean-energy future.

The NY HEAT Act clears certain legal hurdles without which the labor-friendly UTENs cannot be implemented at scale. It is unconscionable that despite lofty goals set by our climate law, we are still expanding the distribution network for fracked gas that leaks and pollutes everywhere, from drilling to distribution to domestic appliances. And it’s even more unconscionable that we are doing this on the backs of our energy customers reeling under inflation while the gas utilities laugh all the way to the bank. Every day without NY HEAT is a day that we’re digging ourselves deeper into a climate and financial hole.

Every day without NY HEAT makes meeting our climate and energy security goals harder and costlier in the future.

Governor Hochul has included climate action and affordable energy among her policy priorities. There is no better way to deliver on this promise than to include all provisions of the NY HEAT Act in the 2024 state budget without delays or loopholes.

Anshul Gupta is a Senior Policy Analyst with New Yorkers for Clean Power and a steering committee member of the NYS Climate Reality Chapters Coalition.  

Rally in the NYS Capitol on May 23, 2023 in support of the NY HEAT Act. (Amber Ruther)

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G.E.T.: How did you get started in this industry?

Sam Major: I started in this industry as a laborer working nights on supermarket refrigeration installs as a 19-year-old trying to make extra money while living with some friends in college. Whilst doing so, I was intrigued and became interested in refrigeration, because it was a mix of plumbing, electrical and HVAC all in one. The days were never the same or boring and I enjoyed it.

G.E.T.: When did you start your company?

SM: Turners started in 1911 as an electrical contractor. In the 1930s, Sam Turner transitioned to refrigeration. Sam transitioned the company to now owner Kurt Matzke’s mentor, Joe Kuentze, and then he transferred the company to Kurt.

G.E.T.: What is your service territory and about how many customers do you serve?

SM: All of Vermont, as north as Derby and as south as Bennington, New Hampshire and eastern New York. We serve around 250 customers.

G.E.T.: What is your area of expertise?

SM: Our focus is on supermarket and industrial refrigeration design, installation and maintenance. I specifically have expertise in building controls and energy management systems specific to refrigeration systems.

What projects do people try to do themselves that really should be done professionally?

SM: I think the low-hanging fruit here is heat pumps. In the commercial space I think that too many people try to do anything electric themselves and think that wire nuts and electrical tape can fix anything.

G.E.T.: If you could only choose one type of project to reduce someone’s carbon footprint or improve efficiency, what would it be and why?

SM: Clean and proper maintenance of refrigeration systems is almost always deferred by a majority of our new customers. We make a large effort to show the importance of keeping things clean. But after that, recommissioning systems to manufacturer specifications.

G.E.T.: Can you share one job project (and some details) that really stands out to you as moving from inefficiency to efficiency?

SM: Recently at a Price Chopper in Colchester, VT we removed and replaced almost every single frozen food case on the sales floor. The rack system, installed in the 1960s quickly became oversized and inefficient with outdated pressure controls. Between us, Price Chopper and Efficiency Vermont, we were able to install an updated refrigeration rack controller and equip the rack with a Bitzer variable speed compressor that ramps up and down in line with current load conditions on the rack. This decreased energy use by 30%. What is it in your field of specialty is most valuable (related to energy efficiency or the EEN) that our readers ought to know about?

SM: At Turners, we are not interested in the repair that is going to just get you by. We want to get you back running and make your system better and more efficient than it was before. Increasing the performance of your refrigeration systems is the quickest and easiest way to immediately find a reduction in your energy use footprint, and your electric bill.

Why should people use an EEN member over someone else?

SM: The Efficiency Excellence Network is a network of hardworking, professional contractors that have not only the customers’ best interest in mind but our state’s energy future in mind as well.

G.E.T.: What are some questions you recommend customers ask when selecting someone to do work to meet energy efficiency goals?

SM: I think it is most important not to try and find the cheapest option. Ask your contractor to inform you on why another product or service may be more expensive. Sometimes the more expensive option is going to be cheaper in the long run, because it may include updated control strategies and future-proof refrigerants.

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First-of-Its-Kind Energy Collaboration Seeks to Help Peterborough, NH Meet Sustainability Goals

Trisha Nail

A technology startup focused on helping municipal officials implement sustainable energy strategies in their communities could lead the charge in the Monadnock Region on electrifying and decarbonizing buildings currently dependent on gas and oil power.

The Town of Peterborough is working to have local contractors make renewable energy upgrades in partnership with BlocPower, a Brooklyn, N.Y.-based consulting company that works with local contractors to upgrade power, heating and cooling systems in older structures.

Contractors, who can send applications to BlocPower to partner with the company, will electrify between 10 and 15 buildings, update appliances in them and evaluate the structures’ weatherization and solar power capabilities. The program runs through June 30, 2024.

“We’re looking at municipal buildings and we’re looking at privately-owned buildings,” said Dennis Luong, general manager of BlocPower’s Northeast region. “There’s a few multifamily buildings that we’d love to look at and then small commercial buildings.”

Luong said such buildings have been “left out of transition” in similar projects BlocPower has observed because while they’re larger than single-family homes, they are not the scale of facilities like hospitals that take priority.

On the low end, individual building projects can cost between $10,000 and $15,000, Luong said, but on the high end could range into six figures. To help cover the costs associated with these additions — air-source heat pumps and hot water heat pumps, for example — BlocPower works directly with building owners through the option of a 15-year financing plan.

With the plan, property owners are not required to make a down payment and don’t see a lien on the building. In the case of hot water heat pumps, BlocPower oversees maintenance of the heat pump and at the end of leasing, the building owner can buy the pump for $1.

The Peterborough project, which kicked off May 9, is a pilot program for BlocPower, with Luong noting it’s the company’s first project in a municipality the scale of Peterborough.

“One of the things that set Peterborough apart was how engaged the town was with this initiative and how they want to see it grow from a pilot to a full-on program moving forward,” Luong said.

BlocPower’s consulting in Peterborough cost the Town an initial $5,000 fee up front, but the money ended up coming from Peterborough Renewable Energy Planning (PREP). PREP is an ad hoc committee appointed by the selectboard comprised of town residents, many of whom have experience in the energy industry.

PREP formed after residents voted to pass a warrant article during Peterborough’s town meeting two years ago pledging to transition to 100 percent renewable electricity sources by 2030 and other energy needs by 2050, according to Dori Drachman, co-coordinator of PREP.

“Trying to get out ahead of where our state was leading us was absolutely a big part of the whole initiative,” Drachman said. “It definitely includes the piece with BlocPower — that we need to get as much help from wherever we can to be able to meet these goals because the state hasn’t been very helpful at all.”

Bob Haring-Smith, a co-coordinator of PREP, said New Hampshire is an outlier in New England for a lack of resources and support for renewable energy and climate concerns.

“It’s a tougher environment politically and financially for BlocPower to be working in than a lot of places where they were before,” Haring-Smith said. “But I think the Inflation Reduction Act and the climate support policies that were in it have made it much more feasible for BlocPower to provide attractive financing for the work they do in a state where they would not otherwise be available.”

Cont’d on p.27
Peterborough and BlocPower hope to look toward upgrading the rest of the community after the pilot’s conclusion, and Drachman said town officials and PREP are in the process of applying for a community block grant from the U.S. Department of Energy — the Energy Efficiency and Conservation Block Grant — that would expand the program.

“We have applied for $500,000. That is for being able to get access to a couple of staff members at BlocPower to help manage the program, and it’s also for direct incentives for building owners that are on some kind of federal assistance program,” she said. “We really want this program not just to be for wealthier residents — we want it to be for everybody.”

Peterborough officials are hopeful their town could be a pioneer in sustainable energy upgrades in the state through coordination with BlocPower, and they’re thinking of their neighbors in the Monadnock Region as the next few communities that could benefit from the consulting work. “We will be looking for other towns and Keene to join with us,” Drachman said. “We think this could be a really great thing to do one of the hardest parts of this transition to 100% renewable. It’s a lot easier to buy a new car than it is to retrofit a house.”

Mari Brunner, senior planner for the city of Keene, said she had an early conversation with Drachman and Haring-Smith to learn about the BlocPower pilot program and that it’s “something we’re interested in learning more about.”

Brunner cited Keene’s Sustainable Energy Plan as an indication of BlocPower’s potential in the Elm City. Like Peterborough’s goals, Keene officials aim for 100% electricity usage in the city to be generated from renewable sources by 2030.

In the wake of the program’s installation work beginning sometime this summer in Peterborough, Drachman highlighted energy contractor training courses slated to be offered later this year that teach participants how to become energy auditors as well as classes that end with people receiving certification to install heat pumps. “If we do succeed in getting these grants and getting people excited about electrifying and weatherizing their homes, we need a lot more people to do this work,” Drachman said.

Building owners in Peterborough interested in working with BlocPower can complete a questionnaire at https://blocpower.io/electrify-peterborough and interested contractors can apply to partner with BlocPower at https://www.blocpower.io/contractor-partnerships.

Reprinted with permission from The Keene Sentinel. This article has been edited from the original. The full posting can be read at https://bit.ly/PeterboroughPartnerswithBlocPower.

Trisha Nail is a business-focused reporter for The Keene Sentinel.
Old House Remodel Allows an All-electric Lifestyle

Dan Vastyan

Maureen Mahle and her husband, Steve Klocke, both work for Steven Winter Associates, Inc. (SWA) – a firm that helps designers, developers, and owners improve their buildings. SWA, a large energy and sustainability consulting firm, has offices in CT, DC, MA, and NY.

In early 2020, Mahle and Klocke purchased a neglected, 100-year-old Colonial-style home in Norwalk, CT, with plans to put their professional expertise to use.

The goal for the renovation was to attain LEED v4.1 for Homes Platinum, ENERGY STAR Homes, and Zero Energy Ready Homes certifications, all of which are currently pending. This inherently meant using lower embodied energy materials and creating a healthy indoor environment.

The old 2,400 s.f. home needed structural improvements, windows, doors, roofing, insulation, electrical rewire, sheetrock, plumbing, heating and air conditioning.

Mahle is SWA’s managing director of residential building services and Klocke is a senior sustainability consultant. – The couple started the renovation knowing they wanted an entire-electric residence, including a solar array and battery storage. The obvious HVAC solution became an inefficient building envelope. Work began there.

Wall cavities were sealed using AeroBarrier whole-house air sealing before mineral wool batts were installed. The exterior walls were covered with one-inch rigid foam. The attic was spray foamed to accomplish both air sealing and insulation in minimal space. The windows featured i89 glass for lower U-values.

“We ended up with a final blower door test of 1.6 ACH at 50 pascals.”

Aldrich said, “For colder climates, Fujitsu has some of the best low capacity, single-zone, ducted systems.” “Their mid-static air handler has some of the best low capacity, single-zone, ducted systems.” “Their mid-static air handler is also really nice to reach several rooms, and to get there with more reasonable-size ducts.”

After a long renovation, the 100-year-old home now boasts a final blower door test of 1.6 ACH at 50 pascals.

Robb Aldrich, principal mechanical engineer at SWA, sized the systems aggressively,” continued Mahle. “Most contractors would say that the system is undersized, but after a winter in the home, I can say with certainty that we have plenty of capacity. Of the heat pump brands we considered, and given the efficiency and the static pressure needed, only Fujitsu offered units in capacities small enough at the time.”

Aldrich said, “For colder climates, Fujitsu has had some of the best low capacity, single-zone, ducted systems.” “Their mid-static air handler is also really nice to reach several rooms, and to get there with more reasonable-size ducts.”

“We’re mindful of the energy we consume, but we don’t sacrifice convenience or comfort,” said Mahle. “We keep the house comfortable year-round – 70°F in the winter because of our two-year-old – and we’re not shy about running our appliances when we want to. The solar array allows us to reduce our environmental impact and still run a household as anyone else would.”

Over the course of the couple’s first year in the home, the property consumed 8,892 kWh, while the PV system generated 12,273kWh in the same timeframe. The 38% net positive result was even better than hoped for.

“Predicted energy use by categories suggests that annual end-use energy consumption for space heating should total 4,281kWh, with space heating and air conditioning 1,784kWh, water heating 414kWh, and appliances 1,603kWh.”

Indisputable performance

A tight house and high efficiency HVAC system were only half the requirements to reach the energy goals set forth. The rest came by way of solar PV, power storage, and a split heat pump water heater. Con Edison Solutions installed an 8.64 kW solar array on the roof, paired with two Tesla Powerwall batteries providing a total of 27kWh storage capacity. The upstairs of the home features a RenewAire ERV system, which provides 100 CFM of tempered outdoor air.

Optimum Energy, LLC installed a one-ton slim duct unit in the attic to serve the five rooms on the second floor, and a one-ton ducted unit in the basement to serve the five rooms on the first floor. A 9,000 BTU wall-hung unit serves a finished portion of the basement.

SIZING AND SELECTION

“At first, we weren’t certain whether to use ducted or non-ducted mini-splits,” said Mahle. “What finally pronounced a clear winner was the fact that we have lots of windows and very few walls. It left us with few places to install wall-hung indoor heads.

“Predicted energy use by categories suggests that annual end-use energy consumption for space heating should total 4,281kWh, with space heating and air conditioning 1,784kWh, water heating 414kWh, and appliances 1,603kWh.”

Daniel S. Vastyan

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cooling consumption around 578kWh,” said Mahle. “But the home has already proven to outperform the energy modelling.”

**Comfort and efficiency**

“After living in the house for a year, our actual energy consumption was 17% lower than our HERS modelling had predicted,” said Mahle. “Our HERS Index, as modeled, was 2, meaning not quite net-zero. In fact, the actual occupancy data has proven that the home performs substantially better than net-zero.

Klocke and Mahle describe the home as “extremely comfortable,” with no spaces that are overly warm or cool. Indoor air quality was of concern during the retrofit as well. There are no fuel-fired appliances in the home, and the fireplace remains in place but it is blocked off.

Air filtration was another top priority, and the RenewAire ERV is equipped with a MERV 13 filter that is changed every two to three months.

“The return filters on the Fujitsu air handling units have been surprisingly clean,” said Mahle. “We think that’s a product of clean finishes and tight home construction.”

During the entire process, consideration was given to sustainability in building materials. The foundation, framing, flooring and doors were all reused and the countertops are wood.

“After seeing the performance and comfort level, we’re very happy that we made the investment in the electrification lifestyle,” said Mahle.

Dan Vastyan is President of Common Ground, Uncommon Communications, LLC. ☞

Counter clockwise: Top left: All appliances in the home are electric; Klocke’s office is served by a 9,000 BTUh wall-hung unit; top rt: Optimum Energy’s Ryan Bouchard, and Nicholas Olsen, testing the ducted system in the insulated attic; the installed mini-split condensing units and heat pump water heater.
In support of President Biden’s investing in America agenda, the U.S. Department of Energy (DOE) announced $46 million for 29 projects across 15 states to develop advanced building technologies and retrofit practices that enable healthier households and communities and reduce energy waste. The Buildings Energy Efficiency Frontiers and Innovation Technologies (BENEFIT) funding opportunity will help advance cost-effective solutions to successfully electrify buildings across the nation while also improving their energy efficiency and demand flexibility. These projects support innovative decarbonization strategies that, when deployed widely and properly, significantly reduce the building sector’s greenhouse gas emissions, eliminate unnecessary or wasteful energy consumption, and reduce strain on the nation’s electric grid. Accelerating breakthroughs in innovative technologies that increase building resiliency while mitigating local pollution is essential to delivering on the President’s plan to combat the climate crisis and build a clean energy future.

“Exploring new ways to build and operate America’s buildings is key to cutting harmful emissions and combating the climate crisis,” said U.S. Secretary of Energy Jennifer M. Granholm. “With this funding, the Department is providing critical new resources to teams from across the nation to transform game-changing ideas into innovative solutions, creating safer and healthier homes and buildings while cutting energy costs.”

Residential and commercial buildings are the largest energy-consuming sector of the U.S. economy, responsible for approximately 40% of the nation’s energy consumption, 74% of its electricity use, and 35% of its total carbon emissions. Estimates indicate roughly one-third, or more, of the energy used by buildings is wasted at a cost of $150 billion annually. Utilizing current technologies and developing new innovations are essential to ensuring buildings across America can quickly and more effectively improve their energy efficiency and decarbonize their on-site processes while advancing environmental and energy justice priorities.

DOE works to reduce the energy intensity and related carbon emissions of homes and commercial buildings by supporting cost-effective technologies and practices, and these selected projects will drive innovations that help drive breakthroughs and continued progress. More than half of the 29 projects selected will pursue advancements to improve space conditioning and water heating, which accounts for just over half of all energy use in American homes. The remaining projects will help advance other components impacting homes and commercial buildings.

Selection for award negotiations is not a commitment by DOE to issue an award or provide funding. Before funding is issued, DOE and the applicants will undergo a negotiation process, and DOE may cancel negotiations and rescind the selection for any reason during that time.

DOE’s Office of Energy Efficiency and Renewable Energy (EERE) is accelerating the research, development, demonstration, and deployment of technologies and solutions to support President Biden’s ambitious plan to transition America to “net-zero” greenhouse gas emissions economy-wide by 2050. EERE is helping to ensure the clean energy economy benefits all Americans, creating good paying jobs for the American people—especially workers and communities impacted by the energy transition and those historically underserved by the energy system and overburdened by pollution.

For more information on DOE’s efforts to make our homes and buildings more energy-efficient and comfortable, visit the Building Technologies Office homepage at: https://www.energy.gov/eere/about-office-energy-efficiency-and-renewable-energy.

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HOPEFUL, HOPELESS AND POSSIBILITIES

John Bos

I must admit that I am one of those people who believe we have passed the tipping point that our climate crisis can be turned around. My belief is based primarily on: what I have learned about those who control the legislation so essential to stemming carbon emissions; how corporate practices reliant upon the extraction of fossil fuels to maintain bottom lines are preserved; and lastly, how a small number of billionaire owners from Elon Musk to Rupert Murdoch have a powerful hold on so much of the information that reaches the public. Media that want to please different sides by engaging in false equivalence in the name of “neutral” reporting.

How about taking an approach emphasizing right and wrong? Who is responsible? Both are often missing from our American media bubble. The result is widespread defeatism about solving our catastrophic climate crisis.

Rebecca Solnit’s climate anthology, “Not Too Late: Changing the Climate Story from Despair to Possibility” is a must-read. She writes that the climate scientist Zeke Hausfather said, “It’s fair to say that recently many of us climate scientists have spent more time arguing with the ‘dooomers’ than with the ‘deniers’ in a Washington Post story titled, ‘Why climate doomers are replacing climate deniers.’”

This dynamic might suggest that extreme weather may actually be creating an opportunity for conservatives to cater to their base. As heat waves or flooding raises the specter of climate change for certain groups, others can use it to raise the specter of the costs of climate policy to rally their base.

Solnit writes, “I was told the public doesn’t care, a couple of other people told me that ‘the media is not covering’ the climate crisis. This was a reasonable position five or 10 years ago, but isn’t at present. Mainstream print media, with its own enthusiasm for grim takes, oversimplification of nuanced climate reports, and distractions like last fall’s fake fusion energy breakthrough, is not doing the job the way I’d like to see it get done. But it is covering climate. There were, for example, multiple climate stories on the online front pages of the Washington Post and the New York Times that day.”

The people putting out defeatist frameworks have more impact than outright deniers, not least because deniers are right-wingers and the right is already committed to climate inaction. Dooomers discourage people who otherwise might act, so they’re working toward the worst outcome: they claim to need to address climate change and weather effects in Democratic or highly educated communities - and less so elsewhere.

The principle on which the grassroots, non-partisan organization Citizens’ Climate Lobby (CCL) was founded. CCL’s mission is to create the political will for effective and fair bipartisan policies to address climate change by helping ordinary people develop new skills and work with others to advance legislation. Powerful polluting industry influence has prevented change for decades, but political will is a game of numbers. With a rapidly growing volunteer membership of over 200,000 concerned citizens, CCL is a force to be reckoned with.

CCL volunteers work locally to inform their community and leaders about expert-recommended bipartisan climate policies. They share simple actions with others, collect policy endorsements from community and business leaders, and lobby Congress. Many citizens are not well-equipped to do this like this, but CCL encourages people to try because taking actions beyond one’s comfort zone is “where the magic happens.”

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What can one person do about climate change? Key negotiator of the 2015 Paris Climate Accord and former Executive Secretary of the UNFCC, Christiana Figueres, said, “None of us individually, but all of us collectively, have the capacity to change the trajectory we are on.”

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No, This is Not the New Normal

New York had $50 million in damages from the flooding. After that happened, Governor Kathy Hochul said, “This is possibly our new normal.” Whether she was correct might depend on what she meant. If she means that we have to come to a time when setting a record is a normal event (ho-hum), then perhaps she was right.

Climate scientist Michael E. Mann posted his opinion at LinkedIn, “The new abnormal: Experts agree climate change is occurring, and through the pipes transporting it.

The leaks the students found are just at the place where natural gas is being used—a final destination after the long process of getting it out of the ground and through the pipes transporting it. But Boston is just an example of a problem that exists everywhere methane is used. Unfortunately, methane leaks exist along a large proportion of pipelines, which carry the gas under pressure, and at natural gas and oil wells. Methane also leaks from coal mines, because methane off-gasses from coal.

The problem is really worse than all that. Methane leaks from abandoned gas and oil wells and from long-closed coal mines. There are millions of abandoned oil and gas wells that are still uncapped and leaking gas in this country, according to an article by the NRDC (www.bit.ly/Methane_2). Much of the cost of capping them will have to be born by taxpayers, because the companies that ran the wells are mostly out of business, and they did not leave behind funding to cap the wells.

Methane leaks are obviously a big problem and a major cause of climate change. But please note: we have satellites that can locate the worst methane leaks, and through the pipes transporting it.

Methane leaks are the worst methane leaks, and through the pipes transporting it.
Climate Extremes and Surprises

Dr. Alan K. Betts

Climate extremes and surprises have both been part of life this summer in the Northeast and elsewhere. Smoky hazy air was blown down again from widespread fires in Canada. In big cities like New York, visibility fell to new low values and the smoke pollution was dangerous to those with respiratory problems, and more generally for the young and old. But why the Canadian fires are so severe this year is not fully clear although, it is clearly a feature of the rapidly warming climate system. In addition Canada refuses to bring its fossil fuel exports under control.

Some places in Vermont got substantial rain in June, followed by many days of sunshine. Then massive floods occurred across the state on July 10 and repairs are still ongoing. With around seven to eight inches of rain in 24 hours across most of the state, almost all of the rivers rose above flood stage and flooded many towns and washed away many roads. Montpelier (see photo) and Barre in the north had the worst floods. It was a reminder of the floods from tropical storm Irene in 2011, but this time there was no tropical storm, just day-long bands of heavy rain over the whole state and some surrounding regions. For days, Vermont was effectively closed in order to evacuate people from flooded regions.

On the larger scale, the ocean circulation in the Pacific and Atlantic is shifting to the warmer state known as ‘El Nino’ after three years of the cooler ‘La Nina’. The global temperatures set new records on July 4, 5 and 6. As the oceans warmed rapidly, the evaporation of water and flooding accelerates, so the climate crisis is fast deepening.

We should not be surprised since the US is largely responsible for the catastrophic climate change now under way. Back in 1978, the Exxon senior scientist James Black identified and modeled correctly the impact of doubling CO2 on global climate. He warned management that a climate disaster lay ahead if they did not change their business plan. His report was suppressed. Exxon and its collaborators (that I called the Fossil Empire in reference1) bribed 139 Republicans in the US Congress for a mere $61 million to publically lie and deny climate change. Webs of lies and ‘greenwashing’ for decades have created an acquiescent public. These are deliberate criminal actions by companies like Exxon-Mobil to make us believe that the planet is fine.

Massive climate change is underway and everything is interconnected. Increased evaporation from warming oceans is the major driver of our summer floods, but our region is mountainous so the distribution of rain is not uniform. Our historic building strategies along the flood plains of rivers need to be reviewed, because extremes are likely to get worse.

The climate system is fully interconnected on a global scale. The Polar Regions are warming faster than lower latitudes as ice melts and this weakens the N-S temperature gradient and the jet stream circulations. Forests and vegetation are also fully coupled to the climate system in complex ways and our understanding increases every year in an area where many indigenous people understand the forest-climate coupling better than our models.

Globally there have been many extremes of both heat waves and floods this summer. In late June 2023, weather extremes gave record-breaking heat waves in China as well as killing so many across the globe in July 2023, temperatures in Texas surpassed 45°C (113°F). A deeper analysis of the summer temperature extremes over land and ocean will emerge this fall.

We have moved into the climate crisis stage that we knew was coming for 45 years and the situation will only get worse. It is bizarre that societies like the US have tolerated the destruction of life on Earth to protect the profits of the fossil fuel companies for long. When will we face the truth, rather than continue to accept the webs of lies?

Climate Change and Society 2021. AIMS Geosciences, 7/2, 194–218. DOI: 10.3934/geosci.2021012

Dr. Alan Betts of Atmospheric Research in Pittsford, VT is a climate scientist. See alan-betts.com.
in early 2021, as inflation made the payment offered by the city too small. And it is not a city-wide cooling program as yet. Juan Louis Lopez, the project supervisor, is currently focused on proving that the pilot project can work. “The goal is to test the technology, to learn from it and fine tune it so we can replicate what works elsewhere.”

Knowing that it is possible to cool our living spaces without making climate change even worse is very important. But a qanat is a big engineering project. Curro Onate, biologist and president of Red Sevilla por el Clima, a citizens’ group advocating for more climate measures in the city, told Bloomberg Green Daily that “Pilot projects are very interesting as experiments. But they are totally insufficient because they benefit a very small share of the city’s population—and usually the most privileged.” Projects like Cartujaqanat must go hand in hand with low-tech solutions like planting trees. According to a Lancet study, about one third of the 67,000 premature deaths attributed to heat in 2015 (which was an average European summer) could have been prevented if 30% of city surfaces (equivalent to one third of the 67,000 premature deaths attributed to heat in 2015) could have been cooled by new-old technology are extended to all. That will take time, but there is much we can do to keep cool. Low-tech solutions can be found in the vernacular architecture of most hot climate cultures. Densely packed buildings that shade the streets can reduce the temperature considerably; these are a fixture in Arabian and southern Mediterranean cities. Covered walkways prevent people and pavements from heating up. So do parking lots covered with solar panels, which have recently been mandated in France. Paris has also begun jackhammering its concrete and blacktopped playgrounds to replace them with natural vegetation. Plants will cool the city and restore degraded habitat, both for wildlife and for French school-children who will benefit from more contact with nature.

In Mexico and the American Southwest, windows, doors, and walkways are frequently shaded with awnings made of wooden slats or simple natural sticks laid on a wooden framework. Pergolas, shade sails, and other simple structures can be an inexpensive, even rustic way of reducing heat in a home that lacks air conditioning. Recently Dr. Gunze Shah Azhar, a heat wave researcher who grew up in India, contributed to two pieces on National Public Radio listing the many ways people in hot regions have cooled themselves off without air conditioning. One of the simplest and most intriguing: Sleep in damp socks, which somehow sounds more comfortable than sleeping under dampened sheets.

Meantime government organizations around the world are trying to raise public awareness about the dangers of extreme heat. An initiative by the Adrienne Arsht-Rockefeller Resilience Center is testing solutions, including an insurance program for outdoor workers underway in India. In collaboration with Seville’s city hall, the Center has begun naming heatwaves. When the heat risk is very high, a local public information campaign is triggered. Seville has had three named heat waves since July of 2022, Zoe, Yago, and Xenia. The Italian Meteorological Society has followed suit, as are other organizations worldwide. When people understand that heat is not just uncomfortable, but frequently lethal, they make different choices. One city in India undertook a public information campaign after a heat wave in 2010 killed hundreds of citizens. In their most recent heat wave, they had 47 people hospitalized for heat stroke, no deaths. Noel Coward, or possibly Rudyard Kipling, coined the phrase, “Mad dogs and Englishmen go out in the midday sun.” It was a satirical comment on the arrogance of empire, but it’s applicable to all of us. Many recreational hikers have died unnecessarily deaths during the ongoing southern heat wave. Heat kills. Stay out of the midday sun.

Jessie Haas lives in a tiny homemade solar cabin with husband Michael J. Daley. She has written over 40 books for children and adults, including The Hungry Place. Read about the Seville project at https://bit.ly/3o8Van-Spain-Natural-A-C.
There is no word for one molecule of water.

Water is what makes earth a green and blue planet.

Water is where we go to sit and meditate.

Water is life.

Water is a great example of a substance that holds it together. The first compound seemingly self-created is water.

Some plants can use water because what would you add to it?

It is a great example of a substance that holds it together. The first compound seemingly self-created is water.
RESOURCES

350-Vermont: General group that coordinates a variety of statewide actions. www.350vermont.org
American Council for an Energy-Efficient Economy: aceee.org
Carbon Tax: carbontax.org
Clean Energy NH: www.cleanenergynh.org/
CO2.Earth: See emissions harms, scientific advice, and pathways to follow. www.co2.earth
Envelope, Driving: http://aceee.org/consumer
Dept. Public Sv. (CEPD): publisher.service.VT.gov/energy/ee_cleanenergyfund.html
Dsireusa.com: Renewables & Efficiency. Find state, local, utility, & federal incentives for renewable energy & energy efficiency. www.dsireusa.com
Efficiency VT: A must-go-to site for immeasurable amounts of info. www.efficiencyvermont.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-freedom-
Home Energy Saver: Interactive site to help you identify & calculate energy savings opportunities in your home.
A lot of great information! - hes.lbl.gov
NABCEP/ North American Board of Certified Energy Practitioners: This organization that tests & certifies PV system installers. Individuals are Certified, companies are not. www.nabcep.org
NESEA/ Northeast Sustainable Energy Assoc.: www.nesea.org
NeighborWorks® Alliance of Vermont: Low-cost energy loans - www.vthomeownership.org
New York Solar Energy Industries Association/NYSEIA www.nyshea.org
NFRC independent rating & labeling system for the windows, doors, skylights: www.nfrc.org/
NH Energy Division: www.nh.gov/soi/energy/index.htm
Renewable Energy World: www.renewableenergyworld.com
Renewable Energy Vermont: www.revermont.org
SEIA/ Solar Energy Industries Association: The SEIA Tax Manual to answer your solar related tax questions. A lot of great information! - seia.org
SmartPower: www.smartpower.org
Solar Components: www.solar-components.com
Solar Jobs: Listed by city, state, and district. SolarJobs.org
Solar Power Rocks: Impressive data and info ,including per state. www.solarpowerrocks.com/
Tax Incentives Assistance Project (TIAP): www.energytaxincentives.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
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.
VPIRG: understand the clean energy resources available to VT - www.vpirg.org/cleanenergyguide
Vermont Passive House: www.vermontpassivehouse.org/Resources/

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• Aug 3-Sep 3: Woodstock, VT
• Sep 12-19: Norwich, VT
• Sep 28-Oct 10: Orford, NH
• Oct 19-24: Reading, VT
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Co-op Food Store 39
Cousineau Forest Products 30
Cover Home Repair 30
Cushing and Sons 21
Efficiency Vermont 25
Drive Electric VT 4
Elmore Roots 35
Energy Catalyst 20
Farmway 39
Farnum Insulators 28
Froiling 22
Geobarns 27
Green Mountain Bikes 6
Green Wave EV 5
Green E-Mowers 37
Groton Timberworks 27
Hanford Mills 2
Heritage Natural Finishes 30
Kohitech 27
Leo & Sons Auto Repair 4
Local Foods Plymouth 2
Littleton Food Co-op 39
Loewen Window Center 26
Maine Janes/Tacklers 37
Maine Solar Solutions 13
Middlebury Natural Foods Co-op 39
Monadnock Food Co-op 39
Montpelier Construction 29
Neighboring Food Co-ops 38
NH Electric Co-op (NHEC) 21
NHSaves 27
Norwich EV 5
Norwich Solar Technologies 11
NY Solar Energy Society 2
O’means Solar 10
Omer and Bob’s 6
Open Sash 27
Pellergy 22
PlugOut Power 5
Real Pickles 38
ReArch 29
RELION Battery 7
RenewAire 28
Resilient Buildings Group 26
South Peak Solar 8
Southern VT Solar 10
Steven Winter Associates 28
Sustainable Heat Now 22
TACO Comfort Solutions 23
TARM Biomass 40
The Radiant Store 40
Upper Valley Co-op 39
Vermont Passive House 30
Vermont Soap Organics 37
Vermont State University 34
Wayside Restaurant 35
Wright Construction Co., Inc. 26
SKINCARE AND SCENTS

Brown Sugar skincare products are handmade by Kesha Janaan. Kesha is a vocalist and bassist who loves to bring the gift of music to the world singing jazz, blues and rhythm and blues, as well as making natural skincare products.

I tried the soaps and the infused oil samples. The soap is great and does not make me sneeze when used on my face, as most other soaps do. I would like to have tried the whipped body butter which is getting rave reviews for leaving skin hydrated all day (even with eczema). Kesha started making whipped body butter to use on her own hair while living in dry, arid Arizona. She started selling the body butter in January 2017 leading to other bath and body products that were being made for herself. All products are handmade using organic fair-trade ingredients (sustainable as well when possible) and are at least 90% natural with most items being 100% natural. Kesha’s Space LLC is in Albuquerque, NM (www.keshajanaan.com).

Urthy scents began from the passion of sisters, Ali and Jen. Both have the beginnings of autoimmune diseases, so it was important to them to use clean, quality ingredients that do not result in headaches and adverse reactions. They decided to make their own products. Out of their need for clean-burning candles, high-quality natural scents and their love of curating a mood, Urthy Scents was born!

I received a sample of two products with the warm sands scent: KWENCH body oil and a coconut wax candle. The presentation was very impressive. The body oil is made from a botanical blend of ingredients designed to help soften, smooth, and brighten the skin while also improving the look of skin firmness and elasticity. The scent of the oil is mild and very pleasant. Even children comment that it smells really good. In addition to spraying it on my skin, I spray the body oil on my dog and around the room as an air freshener. Urthy scents also offers room sprays and diffusers for home or car and many other natural products.

The coconut wax candles come in a simple white glass container with a cork cover, a wooden wick and matches in their own box. I like both products very much and definitely recommend them with no hesitation. Urthy scents are made in Bradenton, FL (www.Urthyscents.com).

BIO-PLASTIC PACKAGING SOLUTIONS

President Biden announced a plan to move America to using 90% bioplastics, leaving many businesses wondering how to get there and make a switch. Food brands like Karma Baker and Flax4Life have successfully scaled their businesses using the 99% plant-based plastics that look and feel just like regular plastic, but decompose much faster and with no harsh chemicals of concern. The packaging is 100% petroleum and fossil fuel free.

I received a sample of the product including a sample of its baked goods. The intention is to share my experience with the good natured® packaging, but the treats were tasty. The company, good natured® is passionately pursuing its goal with earth-friendly products by offering a broad assortment of plant-based products made from renewable resources instead of fossil fuels. They are focused on making it easy and affordable for business owners and consumers to shift away from petroleum to better everyday products* that use... Cont’d on p.38
October is Co-op Month – Celebrate Co-ops!

Erbin Crowell

Recent research has suggested that the success of humankind is rooted in our ability to collaborate, to recognize our interdependence and that the best route to our own well-being is to work together for shared benefit. The modern co-operative movement, which emerged in response to industrial globalization, reflects diverse cultural traditions around the world, and an expression of the bonds of mutual self-help, participation, and sustainability. As businesses that are owned and democratically governed by the people who use them to meet their shared needs, co-ops offer an alternative vision for a more inclusive and sustainable economy that puts people and our collective welfare before profit. In 1948, Minnesota was the first state to celebrate Co-op Month, and the U.S. Department of Agriculture issued the first national proclamation in October of 1964, reflecting the importance of co-operatives to America’s families and rural communities. Since 1971, the National Co-operatives Business Association (NCCBA CLUSA) has continued this tradition, promoting co-operation as a model for inclusive economic development.

For example, farmer co-ops such as Organic Valley and Cabot Creamery Co-op play a key role in the survival of family dairy farms that contribute so much to the character of our region and the vitality of rural communities. More recently, Deep Root Organic Co-op, founded in 1985, has enabled a new generation of farmer-members to market fresh, organic produce across the Northeast and beyond.

A survey by the Neighboring Food Co-op Association (NFCA) found that grocery co-ops across New England and New York play a key role on supporting our local economy, selling more than $512 million in local products annually — or an amazing 25% of total sales. Taken together, the more than 40 food co-ops and start-ups of the NFCA are locally owned by 173,000 members, and provide employment for over 2,465 people, more than 60% of whom are also members, sharing in the ownership of their local grocery store.

Co-ops also show up in some less familiar places. Acom Renewable Energy Co-op in Vermont, for example, was founded in 2008 to help transition area communities from dependence on fossil fuels to a greater reliance on renewable energy. Real Pickles in Massachusetts, which transforms produce from Northeast family farms into fermented foods such as organic dill pickles, sauerkraut, and kimchi, converted to a co-operative in 2013, demonstrating the potential for a more sustainable path for business succession that roots wealth, jobs, and infrastructure in our region over time.

Credit unions, with more than 393 million members in 118 countries, will be celebrating the 75th annual International Credit Union Day on October 19. As not-for-profit financial co-operatives, these community based financial institutions are owned by their members, the people who use them for savings and checking accounts, loans, and retirement funds.

This year’s observation will focus on the proud history of the movement and its continuing efforts to building financial inclusion around the world through the co-operative business model.

As we Enjoy summertime bounty and prepare for the arrival of fall color in our region, Co-op Month offers an opportunity to learn more about the many co-operatives that are part of the fabric of our communities. From farmer co-ops to food co-ops, worker co-ops to credit unions, housing co-ops to artisan co-ops, co-operative enterprises empower people to meet their needs together, growing stronger, more inclusive and resilient local economies, and building a more sustainable world for everyone. For more information on Co-op Month and resources on co-operators, visit https://nfca.coop.

Erbin Crowell is Executive Director of the Neighboring Food Co-op Association, serves on the Boards of Directors of the National Cooperative Business Association and the New England Farmers Union, and is an adjunct professor with the International Center for Co-operative Management at Saint Mary’s University (Nova Scotia). He may be contacted at erbin@nfca.coop.

**Sustainable Products**

Cont’d from p. 37

more renewable materials, less fossil fuel, and no chemicals of concern. Over 400 plant-based home organization products include certified compostable food containers, bio-based industrial supplies and medical packaging, and services. They can be purchased from wholesale, direct to business, and retail channels. The company is focused on making plant-based products more readily accessible to people as a means to create meaningful environmental and social impact (https://goodnaturedproducts.com/).

Ok, I guess I need to leave this on a yummy note. I must tell you what I learned about the Good Karma Bakery after. Their vegan bakery offers a wide range of treats, all made with plant-based, gluten-free ingredients. And it is delivered to your doorstep in little less than three days. They bake, wrap and send your treats in sustainable packaging. How good does it get? Check them out at www.karmabaker.com.

Watch for another product review in our October edition related to our feature about composting.

**SolarFest**

Cont’d from p.20

with the struggles of neighbors throughout the region.

McKibben’s warning is clear, “This is what climate change feels like — still in the earlier stages since we’re less than halfway to temperature our current trajectory will produce.” And he lays out the importance of our continued action to respond to these challenges: “The current rumors are not a reason to stop working. The next round of mobilizations has got to be bigger and it’s got to come soon.”

Thanks to the dedication and commitment of so many, SolarFest made arrangements to reassemble key pieces from the planned 2023 festival. On Saturday, October 28th, SolarFest will present an incredible one-day festival of music and workshops in the historic Grace Congregational Church in Rutland, Vermont.

Titled, “A Climate of Change – Preparation and Action for Our New Future,” the activities focus on different ways we can create a meaningful impact in the fight against carbon pollution, while identifying resources for adaptation and building resiliency to the worst impacts of climate change in the future.


Humorist and stunt memoirist extraordinaire Eve O. Schaub describes what she and her family found with the story behind “A Year of No Garbage: Recycling Lies, Plastic Problems and More,” while VEIC Senior Engineering Consultant Li Ling Young explains the carbon and climate implications and future grid effects of cold-climate heat pumps.

And there’s plenty of urgently useful information in the explanation of the Inflation Reduction Act from Paul Lesure, president of Green Mountain Solar and the roundtable discussion of career options for women in renewable energy.

Following a video message from Bill McKibben, founder of Third Act (which organizes people over the age of 60 for action on climate and justice) the musical performances will begin at 5:00 pm in the beautiful church hall kicked off by the Carolina vocal percussion of Gaminny Moses, followed by celebrated singer-songwriters Louise Mosrie Coombe, Pamela Means, and Lara Hervescott & the Highway Philosophers, concluding with headline performances by Dar Williams and the Ray Vega Band.

Complete details and tickets are available at www.SolarFest.org.

Mike Bailey is a sustainable energy consultant and a trustee of SolarFest, Inc.
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