SPRING 2018 ISSUE 111

GREEN AMERICAN

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INSIDE

New Green Tech: Promise and Pitfalls

courtesy of Solar Roadways

Scott and Julie Brusaw, co-founders of Solar Roadways, with their solar-paved parking lot in northern Idaho. The lot boasts solar panels under fire- and shatter-proof tempered glass that's textured for traction, with a heating element to melt snow and ice. The Brusaws say that if the US converted all roads to solar, we'd generate three times the energy the country needs. *(See p. 14.)*

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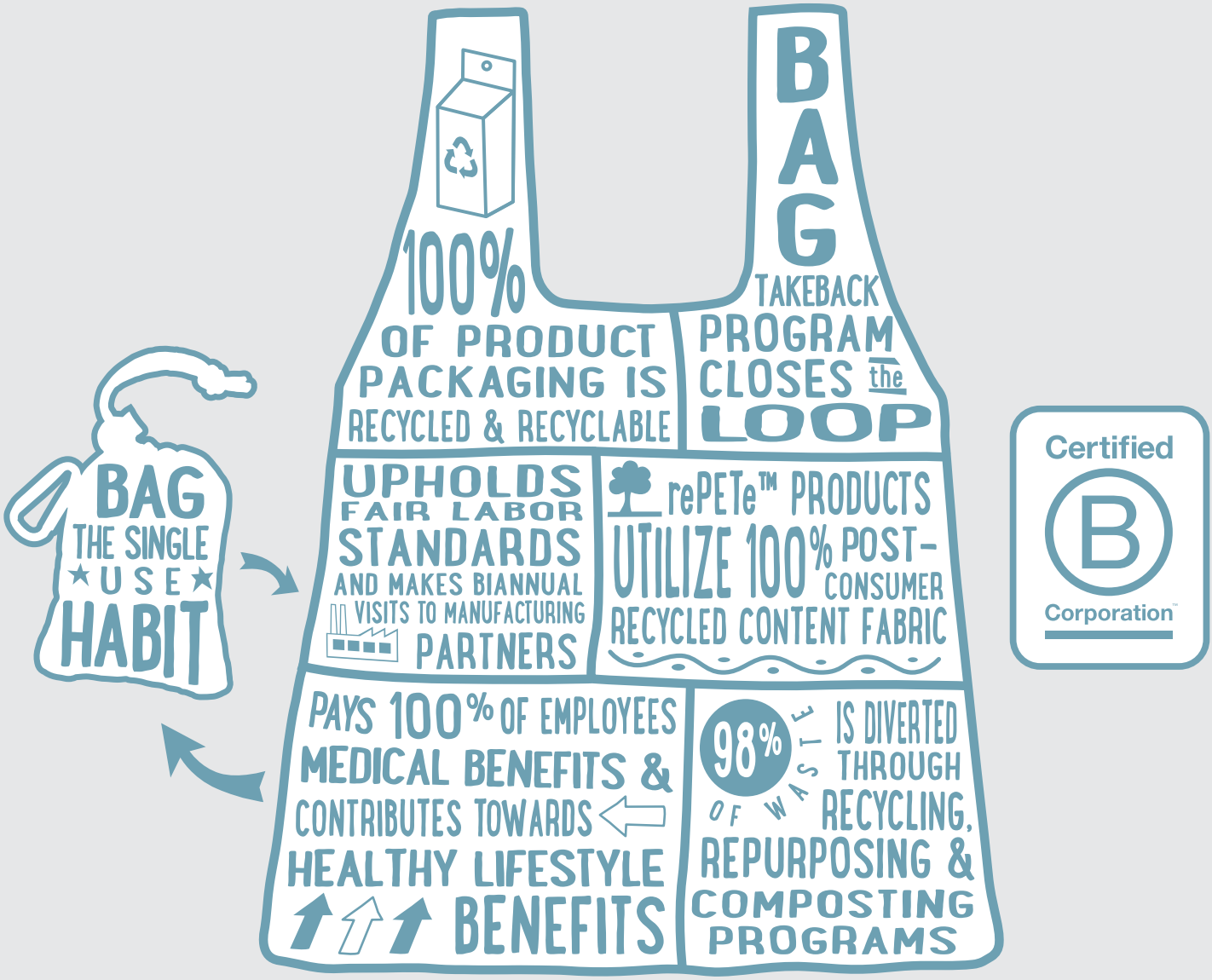

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Green Tech Assist

ALISA GRAVITZ

Will technology save us from the climate crisis, water shortages, and pollution of our air and land? No. That will take our hearts and minds, grit and determination, and new ways of thinking and acting.

But it sure can make an enormous contribution. That's why in this issue, we take a look at green tech (p. 13)—its promises and pitfalls.

Big tech uses lots of energy, especially server farms. That's why Green America is going after big-tech laggards, demanding that they commit to 100 percent renewable energy. And we've got more big news to report: T-Mobile has agreed to be 100 percent green powered by 2021, and AT&T is poised to announce two major green-energy purchases (p. 10)!

Big-tech supply chains expose workers to toxic chemicals. That's why Green America is targeting Samsung, one of the worst offenders, to clean up its smartphone sweatshops (see greenamerica.org/end-smartphone-sweatshops). We also run the Clean Energy Production Network, our supply-chain collaboration working to reduce worker exposure to zero in the big-tech factories around the world.

Most smart-tech devices—from thermostats to refrigerators—run on wireless, which, like cell phones, emit EMF radiation and might not be the healthiest products to bring into your home. Fortunately, you can cut your home energy use by 50 percent or more without wireless while protecting yourself with EMF safety tips (p. 18).

There are also crucial economic and social justice questions about access to energy efficiency and renewables so that all families and communities benefit (p. 33).

And that's where the green-tech story gets really interesting. Bloomberg predicts that solar will be the lowest-cost energy globally within ten years (p. 20)! In developing countries, solar is already providing electricity to people who never had it before—since it doesn't require the build out of a grid. And in many industrialized countries, solar, wind, and battery combinations are cheaper than new natural gas plants—making a 100 percent renewable grid within our reach.

While green entrepreneurs focus on innovations to help us green the world, another tech trend is also helping conserve resources. The trend to miniaturize technology, getting more features with less material, means we are using fewer resources for the products and services people want. Keep in mind, though, that the mines where the metals come from that help make our products smaller often use child labor. Recycle your electronics responsibly with a certified eStewards recycler to reuse that metal so we need less: e-stewards.org.

We can take advantage of green tech, make it a partner in our work for a greener world—as long as we address its problems and don't assume that the tech itself will solve it all.

So enjoy turning the pages of this issue and learning where we can find the tech assist for our work on behalf of people and the planet.

For the future,

Alisa Gravitz, President/CEO

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Plant a Garden: Cool the Climate

BetterPaper.org
BreakUpWithYourMegaBank.org
CleanEnergyVictoryBonds.org
ClimateAction.org + GMOInside.org
GreenAmerica.org/finance
GreenAmerica.org/labor
GreenAmerica.org/restore-it
TakeChargeofYourCard.org

Green America's (Re)Store It! program

CLIMATE VICTORY GARDENS

During WWI and WWII, Europe's ravaged farmlands were no longer capable of producing large amounts of food, which led to a famine that affected Allied soldiers. In 1917, under the leadership of President Woodrow Wilson and then head of the US Food Administration, Herbert Hoover, the US government asked its citizens to support the war effort by starting "victory gardens" to grow their own food so that more food exports could be sent overseas.

Today, leaders in Green America's (Re)Store It! campaign are promoting the same sense of urgency and collective action by encouraging people to plant "Climate Victory Gardens." Rather than assisting in a war effort, these local gardens help combat an impending threat that jeopardizes everyone: climate change.

Not just any old garden will have the climate impact Green America aims for with this campaign. The key to transforming traditional community gardens and urban farms into climate gardens, or gardens capable of sequestering carbon, is in embracing gardening principles that protect soil health and biodiversity.

Newly launched, (Re)Store It! aims to promote regenerative agriculture, a type of farming that turns dead or degraded dirt into rich, biodiverse soil that acts as a carbon sink. A worldwide switch to regenerative farming could reverse climate change. Scientists with Project Drawdown, a nonprofit founded by bestselling author Paul Hawken, conservatively estimate that regenerative agriculture will increase by 1 billion acres by 2050, which would draw 23.2 gigatons of CO_2-equivalent from the atmosphere.

"We wanted a tangible way for people to engage with our (Re)Store It! campaign," says Green America food campaigns director Anna Meyer. "Climate Victory Gardens are a way for everyone to help turn soil into a powerful carbon sink."

The campaign asks gardeners to commit to ten regenerative gardening principles that serve both the environment and the soil. Each climate victory gardener makes a pledge to: grow edible plants, keep soils covered, encourage biodiversity, plant perennials, ditch chemicals, compost, integrate crops and animals (not a must, but integrating animal manure and possibly chickens can make soil richer), use people power and not mechanization, rotate plants and crops, and get to know their garden and understand its efficiency and what works best for it.

Following these principles leads to food production that supports the local economy and soil health, while curbing erosion, pollution, and pests, increasing water retention, and decreasing runoff.

Meyer notes that soil health is literally the foundation of a thriving Climate Victory Garden. Healthy soil sequesters much more carbon than dead dirt.

"It's about making sure that you're growing a diverse amount of plants and that you're building up soil that has major biodiversity in it," she says.

Meyer recommends that new gardeners get their soil tested, especially if they suspect there could be chemicals in it.

For example, "if you're living in an urban area with a history of lots of traffic, your soil could be very lead-heavy from when gasoline had lead in it, as recently as 1995," says Meyer.

Urban food gardeners with contaminated soil may need to construct raised beds and bring in clean soil for safety. But, says Meyer, "if your urban soil is safe or easily rebuilt, our preference is for planting in the ground. It has more of an impact in terms of carbon sequestration and building up healthy, biodiverse soil."

The Climate Victory Gardens campaign will soon launch a website that will link victory gardeners to more resources, including gardening instructions, equipment suggestions, and advice. It will also map climate gardens across the US.

Though likely small in size, Climate Victory Gardens have the potential to enrich entire communities. The increase of local food production spurred by gardens also cuts down on the transportation needed to export foods into various cities, thereby reducing CO_2 gas emissions. And as people learn about the importance of climate gardening at home, Green America hopes they will start demanding food grown with regenerative techniques.

"It goes along with the saying that it's not about a stone; it's about the ripple

it creates," says Meyer. "In the case of Climate Victory Gardens, that ripple spreads outward in the form of community engagement and educating a generation about climate change—all while we work together to stop the climate crisis."

For Climate Victory Garden resources, visit greenamerica.org/climate-victory-gardens.

Menominee Nation Sues to Stop the Back Forty Mine

On January 22nd, the Menominee Nation filed a lawsuit in federal district court against the Army Corps of Engineers and the US EPA, claiming the agencies have failed to adequately review permits for the Back Forty mine.

As reported in the Fall 2017 *Green American*, the Back Forty mine would be a metallic sulfide mine, which experts note is much more prone to creating air and water pollution than a conventional mine. Aquila Resources, the company behind the mine, plans to use cyanide to extract gold and other minerals from sulfide rock dredged up from an open pit located less than 150 feet from the Menominee River. The river feeds into Lake Michigan, which provides drinking water to millions in the Midwest.

When sulfide minerals are exposed to air or water, they create sulfuric acid, a highly corrosive substance that's a suspected respiratory and musculo-skeletal toxicant. Flooding at the mine site would likely lead to acid mine drainage flowing into the river and beyond.

Aquila also plans to site the mine on top of the Menominee Nation's traditional lands. Archaeological studies have confirmed that the area is home to many sacred Menominee cultural and burial sites.

The Michigan Department of Environmental Quality (MDEQ) currently oversees the permitting process for the mine. But, note the Menominee in their lawsuit, the EPA and the Army Corps should have taken over the permitting process under Clean Water Act rules.

"The Menominee River and its wetlands are interstate federal waters, used in interstate commerce under the law. So under the law, this permit cannot be controlled by one state," says Janette Brimmer, an Earthjustice lawyer who represents the tribe, in a statement. "The Clean Water Act is clear that the federal agencies must have the primary role and jurisdiction in this permitting process, and that they are legally obligated to comply with additional protections for the Menominee River under federal law."

Kevin Lancour

Members of the Menominee nation and allies take a "healing walk" on January 23rd in Marinette, WI, in protest of the proposed Back Forty mine, which would be located on traditional Menominee lands and known burial sites.

To date, the MDEQ has approved two of three permits for the mine. The agency held a public hearing on the third permit on January 23rd, the day after the Menominee filed their lawsuit. Several members of the Menominee Nation and other local residents spoke against the mine at the hearing, including Guy Anahkwet Reiter, a member of the Menominee Nation.

"[With] all the things we've been through in our history, from forced relocation to termination [a mid-20th-century set of policies aimed at forcing Native peoples to assimilate into white society] to restoration [the cessation of termination policies], they've done everything they possibly can to break our will. But I tell you, our will will not be broken," he said at the hearing. "We as Menominee people will stand in all adversity. And we'll stand in pride and dignity. And we'll stand on the shoulders of our ancestors that are in the ground that Aquila wants to dig up. ... We'll always be here. We're not going anywhere. This is our land. We will not give up."

Green America has launched a petition demanding that the major investors in the mine project drop their financing for this polluting mine that threatens the Menominee people and local communities.

Sign our petition to Back Forty investors at greenamerica.org/NoBack40. And read our article on the fight at greenamerica.org/BackFortyFight.

Guide to the 2018 Shareholder Activist Season Releases March 8

If you hold stock, you can pressure corporations to be more responsible by voting your proxy ballots. Most of these ballots arrive in the spring from each company in which you own direct stock (not mutual fund holdings). The ballot may include resolutions you won't want to miss on an array of social and environmental issues facing the company. If you're wondering what to expect in the 2018 shareholder season, the *Proxy Preview* can help.

This free digital resource recaps the 2017 shareholder season, and identifies key issues and trends for 2018.

Releasing March 8th, *Proxy Preview 2018* is produced by As You Sow[m], the Sustainable Investments Institute[m], and Proxy Impact. Green America is proud to co-sponsor *Proxy Preview*.

Download Proxy Preview at proxypreview.org. For more information on shareholder activism, visit greenamerica.org/shareholder-activism.

courtesy of Color of Change

Brandi Collins, senior campaign director for media, democracy, and economic justice at Color of Change.

For Economic Justice and Civil Rights

an Interview with Brandi Collins of Color Of Change

The nonprofit Color Of Change (COC) calls itself "the country's largest online civil rights organization." Formed in the weeks following Hurricane Katrina by activist James Rucker and current progressive CNN host Van Jones, COC aims "to respond to injustice and move decision-makers in corporations and government to create a more human and less hostile world for Black people in America." Its campaigns focus on achieving racial, media, and economic justice, as well as working to reform the criminal justice system.

The group has brought about several important victories in its ten years of operation, which include pressuring news networks to drop Lou Dobbs (CNN), Glenn Beck (Fox News), Pat Buchanan (MSNBC), and Bill O'Reilly (Fox News) off the air in light of ongoing racist commentary. The staff helped get justice for the "Jena Six" a group of Black teenagers who COC says were excessively charged and sentenced after defending themselves during a campaign of racist harassment at school. They've gotten Clear Channel to remove vote-suppressing billboards from Black and Latin-American neighborhoods. They successfully pushed for the removal of the confederate flag from the South Carolina state capitol. And they've weakened the American Legislative Exchange Council (ALEC), which the group calls a "dangerously effective" right-wing policy group that is responsible for funneling corporate dollars to politicians to create laws that roll back worker rights and environmental protections, and that "dismantle the gains of the Civil Rights movement."

Like Green America, Color Of Change runs campaigns that hit companies in the pocketbook, as the group presses for corporate accountability. The group has also started embracing divestment as an activist tool, helping to encourage investors to divest $60 million from the private-prison industry.

Green America has worked with Color Of Change to promote the group's Blood Money campaign (see more, next page) and its action last year to pressure corporate CEOs to leave Trump's business councils.

Green America's Tracy Fernandez Rysavy talked to Brandi Collins—who holds a law degree from the University of Wisconsin-Madison and is Color Of Change's senior campaign director for media, democracy, and economic justice—about her work, the group's important wins, and how economic justice and civil rights are inextricably intertwined.

Green American/Tracy: Color Of Change was founded in part as a response to Hurricane Katrina. How has your mission evolved since then?

Brandi Collins: I don't know that the mission itself has evolved. I think the core is always going to be to build power for Black folks and redefine the rules of what's possible in our society, although we definitely see through a wider lens than just Black folks. We know that in order for us to achieve justice, we all have to win. Communities left on the margins have to win.

If anything, we've reaffirmed our mission as we see more and more the structural inequities that continue to work against us and keep us from moving forward toward a collective vision of another world where anything is possible. Where the American dream can feel real for all of us and not just a lucky few.

Green American/Tracy: What do you see as the connections between economic justice and civil rights?

Brandi Collins: At the end of the day, to me, everything is a combination of an economic or a media justice issue. So even when you talk about environmental justice and who suffers, where corporations feel comfortable dumping toxic waste and who they feel will suffer in silence, and why coal

mines are built near certain communities, and why Black and Brown kids have higher levels of asthma, oftentimes, that comes down to an economic justice issue.

All of these different issues—whether tax or economic policies that you see on the local or federal level, or paid child care subsidies, or who most benefits from a tax credit, like the ones we've seen rolled out by this administration, versus social safety net programs—are both civil rights and economic justice issues.

Green American/Tracy: Your executive director Rashad Robinson has said that Color Of Change doesn't just go after the Nazis and white supremacists—you go after the institutions that occupy the mainstream and make racism possible. Can you elaborate?

Brandi Collins: It's tied to something the leadership here has thought deeply about, and that's about understanding leverage as means to build power.

It's not enough to stop who's causing the pain. But [we have to look at] who benefits from the pain. We've seen very acutely the role that Silicon Valley and financial institutions have played in allowing white nationalism to thrive.

[For example], as we go online, information is gathered about us to create a data profile. Everything we click on, every article we share, every pair of boots we buy works toward creating this profile of who the internet thinks we are.

A story that we saw consistently with Dylann Roof [the white supremacist who murdered eight Black churchgoers and their pastor in Charleston, SC, in 2015] and others is of someone who has questionable views on life, or people of color, Black folks, and becomes increasingly more radicalized through their online experience.

The more the internet receives you as someone with white nationalist, alt-right views, the more it's like, "Well, here are ten more people you can follow on Twitter who have more radical views than you. Here's a bunch more articles you can share with your friends that talk about Black-on-Black crime or other false narratives."

It radicalizes people. When you think about it through that lens, then there's a certain amount of accountability that Silicon Valley needs to have.

A white nationalist doesn't care about what Color Of Change thinks about their views. But Silicon Valley cares what Black and Brown folks think of them because they want our money, they want our data. So we have more leverage over them.

Same thing with our Blood Money campaign, [which asks the major credit-card and payment-processing companies to cut off hate groups from their financial services]. We worked with the Southern Poverty Law Center to discover that a lot of white nationalists were using PayPal and different financial institutions to support their sites—to be able to expand, to be able to go into places like Charlottesville, Berkeley, Portland, and create chaos.

Now it's not like these financial companies can say, "Well, we're making billions and billions of dollars off of white nationalists, so we don't want to mess with our bottom line." They were making pennies on the dollar.

But for those white nationalist groups, that $200,000 that they bring in each year allows them to keep their site open, allows them to travel to all sorts of places, allows them to amplify their message of hate.

Again, do they care about Color Of Change or what Black people think about what their site is doing? No. But do financial institutions care that millions of people are coming to them and saying, "We'll cut up our credit card today. And we're going to go out and talk about how you have blood on your hands because of Charlottesville, because the [white nationalist perpetrators] used money they got through your financial system in order to go there in the first place"?

Now the financial companies want to have a discussion. Now they're able to cut off the financial flow that's allowing these groups to thrive.

[*Editor's note: In August 2017, as white nationalists converged on Charlottesville, VA, for a rally, one drove his car through a group of counter-protestors, killing activist Heather Heyer and injuring 35 others. As the* Green American *reported in our Fall 2017 issue, all four major credit card companies, as well as PayPal and Apple Pay, have agreed to cut off white supremacists from their services. Color Of Change notes that they still have hate groups using their services, and it continues to pressure the companies to develop and implement an anti-hate Acceptable Use Policies and divert resources to enforce them.*]

Green American/Tracy: Can you talk a bit more about your work pressuring social media companies, as well?

Brandi Collins: We've had a lot of different conversations with companies in Silicon Valley. Eventbrite was one interesting campaign we ran last year. We noticed that a lot of white nationalist groups and individuals were selling tickets through Eventbrite. Again, this is pennies on the dollar for Eventbrite, but it allows white nationalists to amplify a message of hate.

So we reached out to Eventbrite, Facebook, Twitter, and to their credit, all of these entities have shown a willingness to talk with us, and to say, "This doesn't align with our values. What can we do?"

We've also done a lot of interesting work with Airbnb because of the online discrimination that was happening [against renters] on their platform. That's one corporation that really came to the table and said in our meetings, "We'd rather leave money on the table and get this right than get this wrong."

Oftentimes, these are behind-the-scenes conversations that might result in different policy changes in their most positive form. But if I'm being completely honest, there's still so much work to do.

Green American/Tracy: You've also worked on diversity issues, getting Twitter to release diversity data in 2014. Why is diversity at the highest levels of a company so important?

Brandi Collins: I want to be clear we never call for diversity just for diversity's sake because a Black face in a white place doesn't always ensure equity.

What we've seen time and time again is that when judgments are being made—*Is this racist? Is this a problem?*—there are certain things that go over people's heads when they haven't had that same level of experience.

With Facebook, for example, there was a *ProPublica* article that came out last year where *ProPublica* flagged for executives at Facebook around 50 pieces of hateful

content on their site that had been reported by users but were allowed [by Facebook's Community Standards team] to stay on the site.

Facebook admitted that almost half the time, they had gotten it wrong. Their response was, "We're hiring more and more people." But *who* are you hiring? Are you hiring someone who understands implicit threats rather than explicit? Who doesn't need to see the N-word to know that something is hateful content?

Also, when Facebook, Twitter, Airbnb, and others are making decisions around the type of platform and the user experience, whose user experience are they taking under consideration?

When Uber makes a call that says they're going to advertise in New York as, "Uber, cheaper to get to work than the train," but they're not willing to go into neighborhoods where people might actually benefit from being able to travel to work at a cheaper rate, what does that mean? How are we actually moving the equity of user experience?

By having diversity at all different decision points, it ensures that more of those discussions can happen internally, and you don't have to have a Color Of Change knocking on your door when you've messed up, and our million members asking you what's really going on.

We're also doing some work around Hollywood diversity. Late last year, we released a report where we looked at the state of Hollywood writer rooms. What we see on TV and in our theaters matters.

For many people, they go through life without necessarily having an experience of what it means to have a person of a different ethnicity close to you in your life. So for a lot of white people and other folks, your experience of Blackness or what it means to be Latino or Asian is informed by what you see in the news and on TV, not necessarily by your neighbor.

Who's in the writing room, and who's telling those stories, and how people of color are being depicted matters.

We're also doing work in diversifying newsrooms, because the "fake news" witch hunt led by this current administration has elevated certain mainstream news outlets, and we conveniently forget some of them are the worst when it comes to perpetuating harmful stereotypes around low-income communities and communities of color.

We released a report last year that talked about how Black families are depicted in the media. There were some interesting findings, not just things you expect to see from the more right-wing media but from a *New York Times* or a CNN.

Color of Change's Blood Money campaign is pressuring Visa, Mastercard, American Express, Discover, PayPal, Apple Pay, and other payment processing institutions to cut hate groups off from their services.

Green American/Tracy: I'd love to hear more.

Brandi Collins: The report looked at 800 stories published or aired between January 2015 and December 2016 from national broadcasts and cable news outlets—ABC, CBS, NBC, the *Washington Post*, MSNBC, the *New York Times*, *USA Today*, and other online news sites. This study also correlated with election cycle, so these are the stories that were popping up as certain candidates were emerging.

When the media outlets we examined reported stories about poor families, they chose to feature Black families in their report nearly 60 percent of the time, even though only 27 percent of families living below the poverty line are Black.

Similarly, in coverage of welfare, 62 percent of families portrayed were Black, even though 40 percent of families receiving welfare are Black. Some of the worst offenders were Fox, CNN, the *New York Times*, and Breitbart—less surprising with Fox and Breitbart, a little more surprising around CNN and the *New York Times*.

There's this deliberate decision-making that's putting a Black or Brown face on poverty and on stories about who gets government benefits. Couple that with a narrative that we see consistently in media, shaped by our society, that anybody who does receive benefits or is involved in social safety-net programs is draining the system. They're not seen as being important members of our society.

Also, poor folks are often not shown as working. But most poor folks are actually working; many have more than one job and still are not able to make ends meet. Instead of questioning why that is, there's this built-in assumption of laziness.

When you look at whose faces are being shown when those messages are sent out, it tells a devastating story that has deep impacts from a policy standpoint, from all sorts of standpoints.

Green American/Tracy: You've also looked at local newsrooms as well?

Brandi Collins: When we were looking at local news, we did a report in New York, where we found that every station was over-representing Black crime by

"We've seen very acutely the role that Silicon Valley and financial institutions have played in allowing white nationalism to thrive." —*Brandi Collins, Color of Change*

as much as 77 percent and dramatically underreporting white crime.

There's also another study done by our friends at the National Hispanic Media Coalition, who have led a number of different initiatives looking at the B-roll news stations use, and who's on that B-roll, and who are spokespeople they go to, and what stories are being told.

They found that every time police officers are up for budget renewals, they intentionally feed a higher level of super-predator crime stories to local stations.

The news stations are not even vetting these stories for themselves, or making distinctions like, "Are we showing an over-representation of Black folks?" They're getting handed a stack of stories by police departments that are often disproportionately Black and Brown people, and they're airing them.

That, coupled with a spike in super-predator stories overall means that there's still a lot of work that still has to be done around humanizing our people. And in continuing to call out our elected officials and judges who use that sort of rhetoric as justification to pass or uphold harmful laws and legislation.

Green American/Tracy: How has Color Of Change used divestment as a tool for social justice?

Brandi Collins: I definitely want to get more into shareholder divestment. Our criminal justice team has done some work around divesting from the private-prison industry, including explicitly calling on political candidates to say that they will not accept money from the private-prison industry, especially if they want people of color to vote for them. Hillary Clinton had announced she would not when she was running her candidacy. That was some work happening behind the scenes from Color Of Change and others.

Another campaign that I ran early on in the election cycle called on corporations to divest from the Republican National Convention [because of Trump's xenophobic and racist rhetoric], which is a little bit different from what we typically think of when we have conversations around divestment. We called for corporations to say they will not carry water for white nationalists and will not treat [hate speech] as business as usual when it's not business as usual.

When we have a president that calls—excuse my French—Black and Brown countries "sh*thole countries," and you as a corporation continue to sit down with him even as you rely on our dollars to exist, something's not right there.

Green American/Tracy: Why is it so critical to divest from private prisons?

Brandi Collins: The prison industrial complex, in general, is a system that's built on an economy of filling beds. What does that mean for our communities? Some of the things we've seen happening and the conditions we've seen in for-profit prisons are appalling, and they don't have even a remote level of accountability that maybe public prisons would.

They're all funded by venture capitalists, and their ability to make money depends on putting someone in cages at the lowest possible cost to maximize their profit. When we use that as a structure, there's immediately a huge problem in terms of what sort of treatment incarcerated people receive, and what are the motivations to re-incarcerate and the demotivations to invest in programs geared toward lowering the likelihood that someone will come back to prison.

By the time they go through these horrible prison conditions and are coming back into society, there's no soft landing. Before you even walk out the door, you don't have a chance to succeed, and they're warming up a bed for your return.

Private prisons perpetuate that cycle in a number of different ways, whether it's people who are unable to stay in touch with loved ones, who are incarcerated so many miles away from their families, and even if their families do want to stay in touch, they're unable to travel. Whether it's many of those costs being pushed back on already poor communities, like forcing them to pay for phone calls and food, or all sorts of things. It's just a bad system.

Green American/Tracy: What can white "allies" and non-Black people of color do to support Color Of Change's work and civil rights in America?

Brandi Collins: A lot of different things. We know anecdotally we have a pretty multiracial membership. So if you join Color Of Change, we provide a lot of opportunities for you to stay engaged and a lot of different activation points in your community.

For folks who can give a little, consider giving to organizations of color. And definitely look to the leadership that is emerging from those spaces. We have always seen and continue to see an incredible amount of young, old, multiracial, diverse, LGBTQ leadership. We need to challenge ourselves to be led by those folks.

I also want to mention our work at OrganizeFor.org. This mechanism allows people to start their own petitions. If you see an injustice happening in your community, and you want to do something about it, start a petition, and we will talk to you and help you move from a petition to a win in your community.

They always say social justice people are like cynical optimists. We have to believe another world is possible. I am surrounded and uplifted by all the people doing this work. Maybe we can't imagine that other world because maybe we haven't experienced that other world. But the fact that we keep striving toward it and coloring it in a little gives me hope.

Connect with Color Of Change at ColorofChange.org. Sign on to the group's Blood Money campaign at bloodmoney.org. And start your own Color of Change petition in your community at OrganizeFor.org.

Major Progress: T-Mobile to Go 100% Renewable; AT&T Makes Green Energy Commitment

mj0007 / iStockPhoto

Wind turbines in Oklahoma. T-Mobile announced plans to purchase wind power from a 300 MW wind farm in the state in 2017.

Last August, Green America launched our Hang Up on Fossil Fuels campaign to urge AT&T and Verizon to commit to using 100 percent renewable energy to power their operations. Just a few months later, we've already scored a major victory.

In late January, T-Mobile announced plans to reach 100 percent renewables by 2021, a decision that was already in progress when Green America approached the company.

"T-Mobile was making clean-energy purchases, but after we announced our campaign, it set a goal of 100 percent renewable energy with a more aggressive timeline, and announced two major wind farms," says Beth Porter, program director at Green America.

And when T-Mobile followed up on its pledge by teaming up with us to pile more pressure on AT&T and Verizon, AT&T reacted within days. In early February, AT&T announced that it will purchase 520 megawatts of power from two wind farms in Oklahoma and Texas. While previously, green energy made up less than two percent of AT&T's energy use, the wind power purchase means renewables will make up 20 percent of the company's energy profile.

"AT&T has not made a commitment to 100 percent renewable energy, but these two wind purchases are a significant step in the right direction for the company," says Todd Larsen, Green America executive co-director.

For its part T-Mobile will purchase enough wind and solar power to meet its energy needs, from projects that wouldn't exist without T-Mobile's investment.

"It's not just the right thing to do—it's smart business!" said T-Mobile president/CEO John Legere in a statement. "We expect to cut T-Mobile's energy costs by around $100 million in the next 15 years thanks to this move. Imagine the awesome things we can do for our customers with that!"

The day after T-Mobile made its announcement, Legere released a video committing $500,000 to advancing green-energy initiatives. He challenged AT&T and Verizon to match his company's 100 percent renewable commitment and said he'd up the donation to $1 million if just one of the companies did so by June 1, and $1.5 million if both do.

In the video, Legere directed people to support Green America's Hang Up on Fossil Fuels campaign by visiting our website to e-mail AT&T and Verizon demanding that they embrace renewables. He also asked viewers to share their action via social media with the hashtag #CleanUpWireless.

T-Mobile's and AT&T's announcements come right in time for the February release of Green America's new research report, *Clean Energy is Calling: Assessing the Energy Use of the Telecommunications Industry*.

This white paper shines a light on the enormous amount of energy used by the data servers and networks of the major cell phone providers in the US. In the report—the first to provide in-depth information on clean-energy use in the US mobile telecommunications industry—Green America calls for all telecom companies to commit to 100 percent renewable energy by 2025.

Verizon and AT&T alone are responsible for a huge amount of climate emissions: In 2015, AT&T used 14.8 million megawatt-hours (MWh) of energy to connect its 150 million wireless subscribers, with only 1.26 percent coming from renewables. And since 2011, Verizon has connected its 146 million subscribers using over 10 million MWh of energy each year. According to the EPA's Greenhouse Gas Equivalency Calculator, the two companies' combined annual energy usage is enough to power 2.6 million homes, generating the equivalent climate emissions of nearly 4 million cars.

"T-Mobile's announcement is a game-changer within the telecom industry, which has lagged behind other sectors in making commitments to clean energy," says Larsen. "T-Mobile is making it clear that it is entirely possible for telecom companies, with their massive energy use, to make a 100 percent clean energy commitment. AT&T, Verizon, and Sprint should make similar commitments."

Find the report at greenamerica.org/PhoneReport/.

Take action to pressure AT&T and Verizon to commit to clean energy with our Hang Up on Fossil Fuels campaign: greenamerica.org/CleanUpWireless/.

And view T-Mobile's video mentioning Green America at greenam.org/TMobileVideo.

VICTORY! Mango Acts to Protect Bangladeshi Workers

After the Rana Plaza factory building collapse of 2013, which caused the deaths of 1,134 garment industry workers in Bangladesh, all eyes turned to the country's clothing industry to address worker safety. Months after the incident, labor activists worked with the Bangladeshi government to implement the Accord on Fire and Building Safety, a legally binding agreement to improve safety standards at garment factories. The current Accord expires in May 2018, and a second Accord will go into effect at that point. While 63 companies have signed on to the new Accord, Green America and our allies have been pressuring holdouts Abercrombie & Fitch, TopShop, and Mango to renew their commitments.

As the *Green American* went to press, we learned that Mango bowed to the pressure and said it will sign the Accord.

Through the first Accord, 220 clothing brands and retailers worked with labor unions to improve worker safety and implement regular, independent structural, fire, and electrical inspections.

"While not perfect, the agreement has made workplaces safer for two million garment workers in over 1,600 factories," says Caroline Chen, social justice campaigns manager at Green America.

The second Accord builds on that progress. It creates safe environments for workers to express individual and collective grievances. It will also expand from only clothing factories to those that make cloth, yarn, and other supplies for garments.

"It is crucial that fashion brands continue to build on the good work of the first Accord," says Chen. "The people who make our clothes deserve to go to work without needing to risk their health and lives."

Sign Green America's petition demanding that TopShop and Abercrombie & Fitch sign on to the Second Bangladesh Accord: greenamerica.org/BangladeshWorkers/.

Welcome to New Green America Board Members

Green America welcomes Sara Newmark and Deepak Panjwani to our board of directors. They were elected by and will represent our individual members for three-year terms.

Newmark is the vice president of social impact for MegaFood, and she sits on the boards for the Coalition for Supplement Sustainability and the Vermont Businesses for Social Responsibility. She is active in our Center for Sustainability Solutions.

"I have worked with Green America for over five years in areas of deep importance to both my business and this world: non-GMO and regenerative agriculture. I have been so impressed with Green America's ability to bring people together to solve for a common goal, and the results of their working groups speak for [themselves]. I am both honored and excited to work more closely with Green America to further their work and continue to create positive change in this world."

Panjwani is a Global Data Analyst at Bloomberg. In 2015, he used his "equity hours" from Bloomberg Philanthropy to donate $10,000 to our organization.

"Green America's mission and vision resonate strongly with me. I deeply care about the world we live in. It is an honor to serve Green America!" he says.

We also welcome Monica Flores to the board for a three-year term. Flores is our digital products director. Our Green Business Network membership & marketing manager Scott Kitson was re-elected and will serve a two-year term. Both are worker-member representatives.

GREEN ECONOMY NEWS

THE LATEST FROM OUR GREEN BUSINESS NETWORK®

GreenBusinessNetwork.org
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Lower East Side People's Federal Credit Union Sues Trump over CFPB Appointment

courtesy of Lower East Side People's Federal Credit Union

Members of the Lower East Side People's Federal Credit Union in a workshop for small-business owners. This community development credit union is dedicated to providing fair loans and financial services to underserved communities.

In December, the Lower East Side People's Federal Credit Union in New York, NY, sued President Donald Trump in federal court. The credit union's lawsuit challenged Trump's appointment of Michael Mulvaney as director of the Consumer Financial Protection Bureau (CFPB). At the time, Leandra English had already been appointed director of the independent federal agency by Richard Cordray, who resigned from the position last November.

The agency's governance purposefully separates the president from its leadership to prevent corruption. Trump's appointment of Mulvaney was illegal, according to the CFPB's founding documents.

Congress created the CFPB in 2011, three years after the financial crisis began, to act as a check against predatory, abusive practices in the financial industry.

Mulvaney has previously called the CFPB a "sad, sick joke."

"We support the CFPB as a protector of our low-income members' financial rights, and fear that the appointment of an Acting Director beholden to the White House could result in upheaval and ultimate dissolution of this critical agency," says Linda Levy, CEO of the credit union. "Having experienced the devastation that the 2008 mortgage crisis wreaked on our low-income members, we need the CFPB to protect communities targeted by financial predators."

Unfortunately, in February, a federal judge dismissed the credit union's lawsuit, stating that it did not have the authority to sue and had not proven any "demonstrable impact" to its mission and operations from Mulvaney's leadership.

However, English has her own lawsuit pressing for Mulvaney's removal pending in federal court. Recently, a district court judge sided with Mulvaney, but English is pressing forward with an appeal to hold onto her appointed position.

Green America campaigned for the creation of the CFPB to prevent the financial crisis from happening again. We continue to oppose the Trump administration's efforts to gut the CFPB, including the agency's authority to enforce civil rights in lending.

So will the credit union, says Levy: "We will continue to work for strong regulations to prevent predatory lenders, regardless of what happens to the CFPB in the coming months. As a mission-driven credit union, the financial health of our members is always our top priority."

Contact: Lower East Side People's Federal Credit Union, lespeoples.org.

Clean Energy Leaders Win People & Planet Awards

The awardees in the latest season of Green America's semi-annual People & Planet Award went to companies making big strides in clean energy. Ryter Cooperative Industries, Arcadia Power, and Cromwell Solar each received a $5,000 prize from Green America.

Detroit-based Ryter implements clean-energy projects to help improve communities, such as solar-powered city lighting for safer streets. It also provided solar generators to activists at Standing Rock. It plans to use the award money to increase its green-energy projects in Michigan.

DC-based Arcadia Power created an online platform to give people in all 50 states access to green energy via their electric bills. Arcadia plans to use its award to make its platform available in more areas.

And Cromwell Environmental plans to use the prize money to conduct a "Value of Solar" study in Kansas.

In March, Green America will begin accepting nominations of businesses for the spring season of People and Planet Awards.

Contact: greenamerica.org/people-planet-award.

GREEN TECH for the Future

For better or worse, a vast array of new technology is becoming smarter, more interconnected, and able to churn out mind-boggling sets of data. While some of that tech is merely interesting or adds convenience (and waste!), some might help make our lives greener in the years to come.

courtesy of Pavegen

Google teamed up with UK-based Pavegen to create a piezoelectric walkway and light display at the 2017 Berlin Festival of Lights. Components underneath the walkway harness energy from pedestrian footsteps to power the light display.

It's called the "Internet of Things," a term coined by Procter & Gamble exec Kevin Ashton in 1999. It means an interconnected web of appliances, devices, cars, and other technology that are able to "talk" to each other and share data. Considering the vast reach and scope of the internet, adding a bunch of "things" to it may not sound all that sustainable. The last thing the Earth and our busy lives need is more stuff. But, like it or not, the Internet of Things is on its way.

Green America doesn't suggest you overload your home with wireless devices, due to the health concerns around electromagnetic frequency radiation (see p. 18). But maybe there's a way to harness some of the new (non-wireless) tech for good.

Up-and-coming roads, for example, could help the world harness enough clean, renewable energy to meet all of our power needs and them some (see p. 14).

New devices aimed at upping energy- and water-efficiency save precious resources and save homeowners money (see p. 16).

Innovative ways of harnessing solar power for your home—from solar windows to solar paint to flexible, stick-on solar panels—can make it easier for every homeowner to go solar (see p. 20).

And don't forget that in our previous issue of the *Green American*, bestselling author Paul Hawken and the scientists at his new nonprofit Project Drawdown said that better methods of refrigeration, at home and commercially, is the number one solution for drawing down greenhouse gas emissions and solving the climate crisis. Our associate editor Eleanor Greene takes a deep dive into how that could be done on p. 26.

Green Americans undoubtedly know that buying new devices, appliances, and cars just to get in on the latest fad can be hugely wasteful. It can also adversely impact workers, as overseas factories may cut corners on worker safety and implement forced overtime hours—without extra pay—to meet high demand. But our editors took a look at some of the new tech that's either just launching or coming soon, and some of it could help society take the next step toward a cleaner, greener future.

—Tracy Fernandez Rysavy, editor-in-chief

Smart Tech for a Greener Life

The green homes and communities of the near future will boast technologies that save energy, lower toxins, and protect the planet. Keep an eye on these green innovations, which are available now or will be soon.

Smart Roads

Roads. To an environmentally minded person, they're something of a menace. Too often, they require bulldozing through natural habitat and laying down black asphalt that absorbs sunlight and further warms the planet. But smart highways of the future might make roads a bit better.

ImagineChina / AP Images

China opened up a stretch of solar highway near the city of Jinan in December, to test whether it was economically feasible for its roads to generate power from the sun. China says its solar road can generate 1 million kwh of solar power in a year.

They could harness solar power: In late December, China launched its first solar road, to test whether its roadway system could do double duty by generating power from the sun.

The 1-km stretch of expressway near the city of Jinan is lined with photovoltaic tiles, sandwiched between a layer of insulation on the bottom and transparent concrete on top.

While the country's state-run CCTV boasts that it's the world's first solar-panel highway, the French village of Tourouvre-au-Perche opened 1-km solar road in late 2016, with the aim of testing its energy-generating capabilities over two years.

In the US, Solar Roadways has an ongoing IndieGoGo campaign to fund its company's research and development for domestic solar roads, plus grants from the US Department of Transportation. The company installed its solar road in an Idaho parking lot in 2011 and is currently assessing viability for a larger solar roadway system. Its roads are made of solar panels under textured, fire- and shatterproof glass, with a heating element to melt snow and ice, and LED lights for road markings.

Outlook: Critics point out that solar roads aren't very efficient—flat tiles mean they can't harness the sun as well as the angled panels you see on the roof. And the glass or transparent concrete coating could prove slippery in adverse weather conditions. Plus, while the cost of solar panels keeps nosediving, tempered glass or transparent concrete is pretty much guaranteed to cost a lot more than asphalt in the long-term.

But the people at Solar Roadways say its testing shows that even accounting for flat-tile performance, replacing all US paved roads with solar roads could produce over three times the electricity the entire country uses. Plus, its solar road tiles are textured, solving the slippery road issue.

"A Solar Roadway offsets its cost over time," the company notes on its website (solarroadways.com). "No more contributing to the climate crisis. No more dependency on fossil fuels. No more power outages. ... Safer driving conditions. Far less pollution. A new secure highway infrastructure that pays for itself. A decentralized, self-healing, secure power grid."

They could generate electricity: Could the mere act of driving on a road help provide energy to our communities? Sure, say scientists around the world working with piezoelectric materials.

courtesy of Pavegen

A piezoelectric walkway in Washington, DC's Dupont Circle turns pressure from those treading on it into electricity to power LED streetlamps.

Roads made with piezoelectrics (*piezo* is Greek for "squeeze" or "press") convert the pressure and vibrations from car or foot traffic into usable energy.

While it might sound like a pie-in-the-sky option to the layperson, the technology has already been proven on a smaller scale. UK-based Pavegen has installed over 150 piezoelectric walkways, including one in Washington, DC. When pedestrians walk on it, the DC walkway generates energy that turns on the LED street lamps overhead.

In mid-2017, California invested $2.3 million into two piezoelectric lengths of road. The first project, conducted by the University of California–Merced, will scatter tiny piezoelectric generators onto a 200-foot section of road on campus. The second project, from San Jose-based Pyro-e, will test a half mile of piezoelectric highway with the goal of having it power 5,000 homes.

Says Mike Ward of the California Energy Commission, which is funding the two California programs: "These pilot-scale programs will assess the technical and economic feasibility of piezoelectric systems including power output, life expectancy, durability, cost, and marketing potential."

Outlook: Still unknown, as piezoelectrics have never before been tested at this scale. Ward says the results from the two California projects "will help determine the feasibility of conducting future large-scale demonstrations on highways and streets."

If successful, piezoelectrics could be a real win for the Earth and its climate.

DRIVE GREENER NOW

Greener roads won't solve the massive amount of emissions from driving anytime soon. For that, everyone needs to reconsider their driving habits.

Drive less: The best way to cut your climate and environmental impact from driving is to not drive at all. Walk and bike whenever possible, or carpool or take public transportation. Most public systems have apps available to help you plan your trip. And the increasingly popular Waze app *(waze.com, iOS/Android)* makes finding carpool buddies in your area easy.

Go electric: Powering a vehicle with electricity costs roughly the same as fueling one with $1/gallon gasoline, and it's cleaner, according to Plug In America: Electric vehicles powered by our current coal-riddled grid produce 54 percent less carbon pollution than gasoline cars. If you're worried about charging on long trips, a plug-in hybrid electric vehicle (PHEV) has a gas tank that kicks in when the battery runs out.

Consider biodiesel: Fill a diesel car up with biodiesel, a concoction of vegetable oil and alcohol, to get your driving emissions to zero. Or, you can convert your car to accept straight vegetable oil (SVO), too. Find a biodiesel station near you at afdc.energy.gov/fuels/biodiesel_locations.html.

SMART GARAGES

As cars get greener and roads get smarter, garages are improving, too. Part of the attraction of low-emission electric and plug-in hybrid electric vehicles (EVs and PHEVs) is that they could provide renewable energy storage while they're parked—and smart garages can help make that happen.

Solar power is, of course, available during the day. And in most places, the wind blows more strongly at night. So a conundrum engineers face over a switch to renewable energy is how to store that power for use when the sun isn't shining or the wind isn't blowing as much. Enter smart garages.

Smart garages with vehicle-to-grid (V2G) capacity could pull small amounts of power from the batteries of the cars parked and plugged in inside them, sending that energy into the grid. Most garages are full during the day, as drivers go to work, and that's also when energy use is at peak demand.

The National Renewable Energy Laboratory is currently testing a V2G smart garage on its campus. Likewise, the University of California–San Diego, with a grant from the California Energy Commission, is implementing a plan to test 50 V2G charging stations on campus.

Engineers from Tesla have expressed doubts as to whether the wear and tear on a car battery would make parking in a V2G garage economically viable for drivers in the long-term. But BMW and PG&E just completed an 18-month test of a 100-car V2G program in San Francisco, deeming the project a success. 98 percent of participants said they were satisfied with the program, which has moved on to a second phase of testing.

Smart Water Savers

Cape Town, South Africa, announced this winter that it was in crisis as its water supply is expected to dry up in mid-May. As the climate crisis hits the developing world first and worst, it's critical that we all take steps to conserve water. While the devices below can't replace smart homeowners who take steps to save water in their lives, they could help add on more water savings.

Left: The Orbital Systems OAS Closed Loop Shower.
Above: Kohler's DTV Prompt interface.

A Recirculating Shower: The average US shower uses 20 gallons of water. Orbital Systems aims to put the brakes on that water waste with its OAS Closed-Loop Shower.

Instead of using a small pond's worth of water, the OAS recirculates roughly 1.5 to 3.5 gallons of water, re-purifying it and adjusting pressure and temperature before it washes over you.

At $3,599, however, the OAS may be too pricey for many people.

The Smarter Shower: If you're installing a new shower and have some money to spare, you could consider the Kohler DTV Prompt with Eco-Mode Diverter ($399).

Designed to work with Kohler tub faucets and showerheads, the DTV Prompt is a digital interface that lets you customize your shower's water pressure and temperature. The "warm-up" mode heats your water to your ideal temperature and then stops the shower until you're ready to get in, saving water. And it includes a pause function that lets you quickly and easily stop the water flow for up to two minutes, after which your shower will resume just as you set it.

The device also includes a timer setting, to remind you to get out in a timely, water-saving manner.

The Greywater Heater: The energy used to heat water in your home, including your shower, is the second largest cost driver of utility bills, according to the US Department of Energy. Now you can recover some of that wasted heat with the EcoDrain ($575). This device captures used hot shower water as it goes down the drain uses it to heat clean water before it exits your showerhead.

The Smart Showerhead: For a lower-priced, lower-tech option, consider the Evolve line of low-flow showerheads, sold by Florida Eco Products™ (floridaecoproducts.com) and others. All Evolve showerheads and tub faucets exceed EPA WaterSense thresholds for water savings.

For a smarter shower experience, look for Evolve showerhead models featuring "ShowerStart TSV," or a Thermostatic Shut-Off Valve ($39.99 to $54.99). While they do blast water while your shower is warming up, these showerheads have sensors that detect when the water has reached a comfortable 95 degrees—at which point, they will switch to a trickle, signaling they're ready for you to climb in. You just pull the cord to resume full flow and begin showering.

The EcoDrain.

The Evolve Roadrunner showerhead

Some Evolve models allow you to switch to a trickle whenever you like, so you don't use as much water while you're soaping up.

You can also purchase the Evolve ShowerStart TSV, an attachment that retails for $25.95 and screws in between the wall and the showerhead of your choice, giving it the same warm-up function as the Single Function and Roadrunner.

Smart Faucet: While most of the innovations for water savings seems to be around the shower, a few smart faucets may be coming to stores as well.

You might have seen infrared faucet models in public restrooms that automatically turn on when you put your hands underneath them, and turn back off again when you take your hands away. Now, you can have a faucet with that same function at home, with devices like the iTouchless EZ Faucet Adapter (from $46.64). The EZ Faucet isn't a faucet at all, but an adapter you can screw on nearly any sink faucet to enjoy the water-saving feature.

The company says the EZ Faucet can save an average household 200 gallons of water a month.

Kohler offers its DTV Prompt (see previous page) for tub faucets as well as showerheads.

You might also find smart faucets with wireless capability and smart screens, like the Nomos from Fima Carlo Frattani. The Nomos has a touch screen that allows you to control temperature and pressure, and it also has a pause feature that heats up the water to the ideal temperature before it comes out of your tap.

However, it's not yet clear whether the water savings of a faucet like the Nomos offsets its energy use when connected to the current power grid. And the fact that it's wireless means it may be one to skip if you're worried about EMF radiation (see p. 18).

The iTouchless EZ Faucet

SAVE WATER NOW

You can curb your water use without fancy faucets and showerheads. Green America's recent article, "13 Ways to Save 65+ Gallons of Water a Day" (greenamerica.org/savewater) includes several tips to lower your water waste. The top savers we found are taking five-minute showers (a simple timer can help), fixing leaks in your home, and washing full loads of laundry and dishes.

In addition, conventional low-flow showerheads, toilets, and faucets offer water savings without complex gadgetry. Find green businesses offering smart and analog water-saving tools in the "Water Conservation" category at Green America's GreenPages.org.

SMART AIR MONITORS

Green America has often recommended getting a Home Performance with ENERGY STAR audit (energystar.gov), because this type of audit not only thoroughly points out energy leaks in your home but will also give you ways you can improve indoor-air quality. Now, new smart monitors can provide some of the same indoor-air monitoring 24/7.

The uHoo ($199) tracks airborne chemicals and particulate matter inside your home, letting you know when levels are too high for health. It also tracks carbon monoxide, ozone, CO_2, humidity, and temperature.

In addition, it provides charts tracking your indoor air over time, so you can easily identify pollution sources and patterns. And it'll send you alerts via a cell phone app if your levels are unhealthy.

The Foobot ($179) detects invisible air pollutants inside your home, letting you know which are occurring and in what quantities via an LED display. In particular, it looks at chemical pollutants and particulate matter, as well as temperature and humidity.

Like the uHoo, it provides charts tracking your indoor air over time, so you can easily identify pollution sources and patterns. And it will compare your indoor air to your geo-located outdoor air, letting you know if you'll get some relief by opening the windows or not.

The Awair ($165) tracks dust, chemicals, CO_2, relative humidity, and temperature. It'll also send you personalized recommendations via an app for cleaning up the air inside your home.

You'll need WiFi to set all three up and take advantage of all features. After setup, the Foobot will work offline. You'll just forgo the feature that allows you to send data to the cloud and get back personalized recommendations. The uHoo turns off completely (including WiFi signal) when it's not actively monitoring—which happens once every minute for ten seconds or less. But if you have hard-wired your internet for safety (see p. 18), neither it nor the Awair will work sans wireless.

Smarter, Safer Energy Savers

Smart thermostats and other WiFi-connected energy-savers are all the rage. But do you need them to cut your home energy use?

Find more graphics and resources at ehtrust.org/resources-to-share/. *courtesy of Environmental Health Trust*

The popularity of smart thermostats is on the rise. Devices like Google's Nest use a feature called "geo-fencing" to use sensors in your home and the signal on your mobile phone to turn themselves to an eco-friendly lower setting while you're away. Some take a few days to learn your heating and cooling habits, then adjust your thermostat accordingly while you're in your house or apartment, or will allow you to program and schedule settings. Many will give you regular reports on how much energy you're saving and send you warnings if the temperature ever plummets to the point where a pipe could burst.

You can also find smart lighting that you can dim, brighten, shift colors, and turn on and off via an app. Or smart switches that allow you to turn the devices they're connected to on and off, program them to a timer, or even check for "phantom load" power leaks (energy that drains from a device when it's turned off) via an app. And then there are full-house monitors that connect to your breaker box and monitor your energy use all throughout your home, generating energy-use reports and pinpointing energy drains (say it with us) via an app.

Sounds nifty, right? But nearly all the new energy-saving tech Green America's editorial team found requires a wireless connection. And, say many experts, wireless devices may not be the healthiest things you can bring into your home.

The good news is, you can cut your home energy use by 50 percent or more without wireless.

EMF Radiation and Health

Back in 2011, the *Green American* sounded a warning about EMF radiation, particularly that emitted from cell phones, since people hold them close to their heads and bodies.

EMF radiation is produced by electricity as it moves through a wire. The National Cancer Institute notes that there are three different types of EMF radiation: extremely low frequency EMFs, like those emitted by electrical wiring and corded devices. On the other end of the spectrum are high-frequency EMFs like X-ray and gamma-ray radiation that are known to damage DNA, which can lead to cancer.

In the middle, you have radio-frequency EMFs, which are emitted by wireless networks, smart meters, cordless phones, and cell phones.

These wireless devices can harm human health, says Dr. Devra Davis, a scientist who is the president of Environmental Health Trust, lectures at top universities and medical schools, and literally wrote the book on cell phones and EMFs: *Disconnect: The Truth About Cell Phone Radiation, What the Industry Has Done to Hide It, and How to Protect Your Family* (Dutton, 2010).

"All wireless devices from smartphones to wireless laptops to baby monitors come with FCC warnings that they are not safe to use if held directly on the body because the radio frequency emissions can exceed government limits," says Davis. "There is a growing body of experimental evidence showing that cell phone and wireless radiation is linked to miscarriages in pregnant women, lower sperm counts, increased brain tumors, and changes in blood markers that can lead to inflammatory conditions like arthritis and cancer."

Cell phone and wireless radiation are the same type of radiation, says Davis. But cell phones are more of a worry since most people place them directly next to their heads, and children are handed them as toys.

"Every millimeter away gives you 15 percent less radiation," says Davis.

But, she notes, wireless devices in close proximity to our bodies may still expose us to unhealthy amounts of EMF radiation: "For many smart tech devices, whether it's a dryer, fridge, washing machine, we don't even know

where the wireless components are implanted. We don't know where they're located, how often they're on." And that, she says, could be a problem.

EMF Warnings Abound

In recent years, more and more respected bodies have issued warnings on wireless and cell phone radiation, particularly with children, whose bodies absorb more of it than adult bodies do.

In 2011, the World Health Organization classified radio-frequency radiation from cell phones, wireless, and other devices, as a "possible human carcinogen," the same category into which it places jet fuel and lead.

In 2011, researchers from the National Institutes for Health released a study that found altered brain activity on PET scans when a cell phone was held up to a person's head.

In 2011, scientists at Yale University found increased levels of hyperactivity and memory problems in mice exposed to wireless radiation *in utero*. Shortly thereafter, Yale and Harvard scientists issued warnings to pregnant women to reduce their exposure to wireless radiation.

In 2012, scientists at Kaiser Permanente published a replication study in *Scientific Reports* after finding pregnant women exposed to "real-world" levels of non-ionizing radiation (which includes EMF radiation) had nearly three times more miscarriages than women who weren't exposed.

Belgium, France, Australia, Russia, the UK, India, Finland, Turkey, Canada, and the EU have all recommended reducing children's exposure to wireless and cell phone radiation.

In December 2017, the state of California issued guidelines to help reduce children's exposure to wireless and cell phone radiation.

And in February, the National Toxicology Program released the results of a multi-year study on mice and rats. It found that male rodents exposed to high levels of EMF radiation grew rare, malignant tumors in the brain and heart.

"Genome research shows that humans differ genetically from rats by three percent," says Davis. "Every agent that we know causes cancer in humans will also produce it in animals when adequately studied."

In addition, Davis points out that the fine print in most cell phone user manuals generally warn people to keep the phones about an inch from your body, and away from pregnant women.

Save Energy Without Wireless

While new technology can make saving energy easier to do from your couch, it's very possible to drastically cut your home energy use without it.

In our 2010 *Efficiency First!* issue, we laid out techniques for improving your home efficiency by 50 percent. Find our handy, updated infographic to help you do so online at greenamerica.org/efficiency-first.

For example, you can easily find an inexpensive, non-wireless programmable thermostat. Just programming your thermostat to heat or cool less when you're away or sleeping can cut your home energy use by ten percent.

You don't need smart switches to remind you to turn off the lights. Put a sign or sticker near your lightswitches to remind your household to avoid lighting up rooms when you're not in them.

And you can check for phantom load energy leaks with a Kill-a-Watt meter, which will measure the energy drain of devices and appliances you plug into it.

For a more comprehensive take on plugging energy leaks, call in a Home Performance with ENERGY STAR auditor (*energystar.gov*), who will pinpoint areas where your home is wasting energy and give you suggestions to fix them, in addition to flagging indoor-air pollution sources.

For a DIY approach to an audit, the free Homeselfe app (*iOS, Android: homeselfe.com*) takes you step-by-step through your home, asking you questions about your energy use, then generates recommendations to help you make your home more energy efficient. It even connects you with local energy rebates for which you may be eligible.

Finally, installing LED bulbs uses 75 percent less energy than incandescent bulbs, and the average US home will save over $1,000 over a ten-year period, according to a 2017 cost analysis by the Consumer Federation of America.

—Tracy Fernandez Rysavy

EMF SAFETY TIPS

Use these tips from Environmental Health Trust (*ehtrust.org*) to keep yourself and your family safe from cell-phone and wireless radiation:

- **Limit children's exposure.** Their smaller bodies absorb more EMF radiation than adults do.
- **Distance is your friend.** The amount of radiation the human body absorbs decreases by 15 percent with every millimeter away from the wireless device. Keep devices away from the body and your bedroom. And put devices on a table or desk, not your lap.
- **Use the speakerphone setting** on your cell phone instead of holding it against your head, or use a headset. (Corded airtube headsets are best.)
- **Avoid carrying your cell phone in a pocket or bra**. Carry it in a bag with the back facing away from you.
- To keep your phone or device from emitting any radiation, **turn off the WiFi and Bluetooth settings and put it in airplane mode** when you don't need to be online.
- If you use your phone as an alarm clock, **put it in airplane mode**.
- **Hard-wire devices** that connect to the internet whenever possible.
- If you can't hard-wire your home, **turn off wireless routers at night**.
- **Use corded phones** when possible. Cordless phones still emit EMF radiation, but it's much less than that emitted by cell phones.
- **Keep an eye on your signal strength.** The weaker the signal, the more radiation your device emits, as it's working harder.
- **Avoid making calls while traveling in a motor vehicle or elevator.** The phone works harder to get a signal through metal, so it emits more radiation.
- **Never give a cell phone to young children** who still put toys in their mouths.
- **Reinforce the message with teens**, who often sleep with their phones or carry them in a pocket.

The Bright Future of Solar Power

Coming soon: innovative new ways to generate electricity from the sun, from virtually indestructible solar roof tiles to solar window glass.

courtesy of Tesla

Tesla's solar roof tiles harness solar energy and protect your roof just like normal shingles. While the company guarantees the solar-generating capabilities of its shingles for 30 years, it says the tiles themselves are practically indestructible and guarantees them through "the lifetime of your home or infinity, whichever comes first."

Solar is booming. Solar power is now cheaper than coal in some parts of the world, and generating power from the sun is likely to be the lowest-cost energy option globally in less than ten years, according to Bloomberg. In many places around the world, solar is already the lowest-cost option.

Even the big utilities are moving rapidly toward solar (and wind, which is also poised to best coal in terms of cost). The *New York Times* reports that Xcel Energy—which provides electricity to the middle of the country, from Colorado to Texas to Michigan—has asked for proposals to build large wind and solar power plants in Colorado, and bids are already coming in lower than the operating costs for coal plants. West Coast energy provider Pacific Gas & Electric has committed to making renewable energy, including solar, 55 percent of its power portfolio by 2031. Many experts think that California will hit the 50 percent renewables mark by 2025—maybe even sooner.

Compounding solar's impending energy dominance, researchers are exploring new ways to generate solar energy for human needs. Innovative methods of harnessing solar power, like stick-on solar tiles and solar roof shingles, may be coming soon to your neighborhood.

Solar for Every Home

Sunflare, a Los Angeles-based startup, is looking to become the next solar heavyweight with its lightweight panels. Compared to conventional solar panels, Sunflare's panel products have the same metallic blue look, but not much else in common.

The company's panels are thin, flexible, and lightweight. Instead of silicon and glass, Sunflare uses a stainless steel substrate with copper, indium, gallium, and selenide to make a semiconductor that's only a few micrometers thick.

Rectangular Sunflare panels come in both standard and custom sizes. With super-thin panels come more possi-

bilities. Rather than relying on heavy aluminum frames and skilled installers, Sunflare panels will stick almost anywhere with a special adhesive, and because they're flexible, they can follow a curve instead of being limited to flat installations.

If a branch shades a traditional solar panel on a home's roof, it will trigger the shutoff of that panel or a series of panels, explains Sunflare's chief marketing officer Elizabeth Sanderson. She notes that Sunflare panels have more diodes that help bypass just the shaded area.

In addition, these unique panels can be used with off-grid homes that can't support regular panels, like trailer homes, tiny homes, or RVs.

One of Sunflare's first customers stuck the panels onto her tiny home in Spain, allowing her to live off the grid. And Vistabule, a camping-trailer manufacturer, has worked with Sunflare to incorporate panels into the roof of its teardrop-shaped trailers.

Sanderson says she's excited about the products' commercial applications: "Silicon panels are four times heavier than the Sunflare panels. Warehouses and distribution center roofs often can't handle that kind of weight. Also, commercial building owners aren't very happy when they have to puncture their roofs to install racking. But they are happy with Sunflare installation; it's peel and stick. And the panels are durable and can provide more insulation for the building. It's a win-win-win."

Because Sunflare is in the initial phases of scale-up and in the beginning of its technology lifecycle, its prices are about 50-100 percent higher than traditional panels. However, that gap narrows as you take its much cheaper installation costs into account. Sunflare is currently ramping up as it awaits safety certification for commercial membrane roofs this month.

courtesy of Sunflare

Sunflare's stick-on solar tiles make it possible to generate solar power on curved surfaces. Vistabule, a Minnesota-based teardrop trailer manufacturer, is installing Sunflare panels on about half of their new trailers.

Solving the Storage Problem

Of course, one can't talk about new ways to integrate solar without talking about Tesla. With its big money and perpetual media buzz, Tesla has moved quickly from the car industry into residential solar.

In the past, one big concern with solar was how to store power generated during the day for use at night. In 2015, Tesla launched its Powerwall, a giant solar-storing lithium ion battery that solves that issue. Each Powerwall battery can hold ten Kilowatt hours (kWh) of electricity. By comparison, a car battery holds about 1.2 kWh.

The Powerwall is the best-known of a few products that let people store solar energy. LG, Panasonic, BMW, and Nissan, as well as several start-up companies, all sell "home batteries" similar to the Powerwall. (Nissan uses recycled batteries from its electric cars to power its xStorage battery, which is about $1,000 cheaper than Tesla's.)

Solar Roof Tiles

Tesla began taking orders for its Solar Roof last May. Solar Roof tiles look identical to regular roof tiles—whether you have basic gray shingles, slate tiles, or clay Spanish tiles. But Tesla tiles generate solar power, invisibly. The Solar Roof currently comes in four styles and can be installed on the entire roof or just on the sunny side.

Consumers thought it would be years or decades before the Solar Roof would hit the market. But in January 2018, Tesla confirmed that the roofs had been installed on homes of company executives, and installation has begun at the homes of non-employee customers.

Tesla has an online calculator to estimate how much you'll spend on a Solar Roof per month based on the size of your roof, minus the value of the energy your Solar Roof would generate and any available tax incentives. For Green America associate editor Eleanor Greene's 990 square-foot roof in Washington, DC, and $90/month energy bill, the calculator estimated her net cost at $37/month (compared to an average $22/month for regular roof shingles) over the 30-year life of the roof's solar capacity.

Tesla guarantees the tiles will last through the life of your house (or infinity, whichever comes first) even if the solar capacity stops working after 30 years.

Tesla recently announced it would put kiosks in 800 Home Depot stores across the country to sell its solar panels, Powerwall batteries, and Solar Roofs, and Lowe's is in talks to sell Tesla solar products as well.

Invisible Solar

Though they may sound like an enviro-fantasy, solar windows could be on the market soon. A solar window is a transparent glass window that uses sunlight to create electricity, just like a solar panel.

Bad news first: solar windows are still in the development stage in the US. The purpose of a window is to let light through, but solar window technology requires striking the right balance of captured light for energy and remaining light that can brighten a room.

The good news is that companies in the US and abroad have produced solar windows that work, suggesting that

courtesy of SolarWindow Technologies

SolarWindow Technologies has created a SolarWindow™ that converts sunlight into energy.

these technologies may be available to consumers sooner than we think.

In 2017, SolarWindow Technologies announced a partnership with Triview Glass Industries to create SolarWindow™ products that can generate electricity. The key to this new invention is in SolarWindow Technologies' liquid transparent coatings that make the glass act as a photovoltaic device.

Once it reaches the commercialization stage, the Maryland-based company plans to use these windows to turn skyscrapers into vertical power generators.

"Our company is essentially writing the chapter on large-area commercialization of organic photovoltaic devices and panels," says CEO John A. Conklin.

Buildings consume 40 percent of electricity in the US, and the company anticipates that SolarWindow coatings could cut the annual $150 billion dollars it costs to pay for their electricity in half, according to company models, which feature SolarWindow on all four sides of a commercial building.

In addition to its commercial glass products, the company is developing window glass for residential homes.

Meanwhile, Physee, a power company in the Netherlands, has patented similar solar windows made with transparent double-paned glass. Physee has already successfully installed these PowerWindows in commercial office buildings in Amsterdam's Zuidas business district and plans to install 1,850 square meters of them in Amsterdam's BOLD apartment high-rise.

Solar Paint

In June 2017, Australia's Royal Melbourne Institute of Technology (RMIT) announced that its researchers have developed a solar paint that could eventually generate solar power on its own.

Led by Dr. Torben Daeneke, the team invented a paint made with titanium oxide, a common ingredient in paint and sunscreen, and synthetic molybdenum-sulphide, a compound that absorbs moisture in the air. The chemical combination uses both sunlight and moisture to convert water into hydrogen fuel, as well as oxygen.

Dr. Daeneke explained to the *Sydney Morning Herald* that the final product of the paint would need to include membranes that can harvest hydrogen selectively for energy use.

In the past, hydrogen energy has depended on unclean processes like the burning of fossil fuels. RMIT's paint demonstrates that hydrogen can be a clean energy source when hydrogen is generated with renewables.

Solar in the City

Danny Kennedy has been in the solar business a long time, as a clean energy advocate at Greenpeace in the '90s who went on to found rooftop solar company Sungevity in 2007. He's part of Green America's Solar Circle, which has brought together industry leaders to push the solar industry into quicker progress since 2002. Now, Kennedy works with green entrepreneurs at the California Clean Energy Fund, an early stage fund for clean-energy projects, and Powerhouse, an incubator for clean-energy startups.

He's excited about anything that makes solar easier to get to customers. But what he really gets a kick out of is seeing people starting to put solar panels in unexpected places—like solar-powered trash cans from Bigbelly. (He doesn't have a working relationship with this company.)

"Who knew you needed that? Because solar is cheap enough for people to put an engine in a trash can, municipalities can buy trash cans that compact the trash and can call to be emptied when they're full," Kennedy explains. "The result is less litter on the streets and more efficient litter collection, which saves cities tens of thousands of dollars."

Kennedy names bikesharing systems as another model that wouldn't be the same without solar—especially dockless systems like that of the company Mobike, which Kennedy met with last summer. Mobike bikes have a solar panel in the bike basket, connecting the bike's lock and GPS to a phone app, so customers can easily locate, reserve, and unlock the bikes they want to use. Without solar, the whole automated process would require a very expensive battery, Kennedy says. He adds that providing more bikeshare options means fewer trips by car, so it decreases traffic pollution and congestion.

A Bright Future

In 2016, solar became the fastest growing source of energy in the US, and the biggest employer of all energy industries, with around 370,000 employees, compared to 187,000 in all fossil fuels combined, according to the US Department of Labor. The price of solar fell 165 percent from 1975 to 2015, as the megawatts installed globally surged from two to 65,000 in the same period, according to a report by Bloomberg and the Earth Policy Institute.

Given the harsh realities of the climate crisis, the world's impending approach to peak coal and peak oil, and the rapid adoption of solar worldwide, Kennedy says the future looks very bright indeed for solar power, and he expects more solar innovations to keep coming.

"The US pioneered something world-changing, literally," says Kennedy. "Photovoltaics, invented by Bell Labs in 1954, already have and are going to continue to completely transform civilization until we become a completely solar-powered society."

—Eleanor Greene, associate editor, and Sytonia Reid, editorial fellow

A Living Building? Challenge Accepted

Buildings certified by the Living Building Challenge go beyond green materials. They actually improve people's lives and the surrounding environment.

Buildings that simply mitigate environmental damage aim too low, says the International Living Future Institute (ILFI). People shouldn't have to settle for buildings that don't improve their lives and the environment around them. Now, they don't have to thanks to the ILFI's Living Building Challenge (LBC), which the nonprofit touts as the world's most rigorous sustainable building certification.

The LBC goes beyond known green-building certifications like Leadership in Energy and Environmental Design (LEED) and Cradle-to-Cradle by elevating the goal from environmental mitigation to regeneration.

Every act of design and construction on a living building should "make the world a better place," according to the ILFI.

Washington University's Tyson's Living Learning Center. courtesy of Washington University

A Building That Gives Back

As its name hints, successfully completing the Living Building Challenge is no easy feat.

To earn full certification, builders need to meet high green standards in seven focus areas, called "petals": eco-materials, health, a sense of place, water conservation, energy efficiency, equity/accessibility, and beauty.

Builder teams earn individual petal certifications as they complete each portion of the challenge. Once they achieve all seven petals, demonstrated through performance data over 12 consecutive months, the ILFI awards full living building certification.

The ILFI uses the metaphor of a flower because, notes the organization, a living building "should operate in the same clean, efficient, low-impact manner as a flower."

"Often when people talk about sustainability issues, they think mostly about natural resources, but the Living Building Challenge is also socially related and community related. It requires a broader way of thinking," says Kathleen Smith, vice president of the Living Building Challenge.

This broad way of thinking transforms into action when builders meet the LBC's seven petals:

- **Materials:** The LBC's Materials Petal ensures that living buildings are made from regenerative, nontoxic materials. Projects cannot use any of the toxic and hazardous chemicals on ILFI's Red List (available by clicking on "Materials" at *living-future.org/lbc/*), which include asbestos, lead, phthalates, PVC, and more. ILFI's "Declare" database lists the hundreds of healthier construction materials and products acceptable for use in living buildings (*living-future.org/declare/*).

Living buildings also have to use a one-time carbon offset provider to offset construction-related emissions.

To meet the LBC's materials requirement, the project team for Washington University's Tyson's Living Learning Center, a fully certified Living Building in Eureka, MO, gathered woods from the Tyson Research Institute's 2,000-acre sustainably managed forest property. The Eastern Red Cedar and Hard Maple trees in that local forest supplied wood for the Tyson Living Learning Center's exterior sidings, trims, and floors.

Sourcing wood near the property site also fulfilled another living building mandate: that a certain amount of construction materials (as well as all hired consultants) come from the region.

The project team also replaced doors made with lead and sustainably harvested wood (which contained formaldehyde) with stainless steel, salvaged wood doors, and salvaged hardware.

- **Health:** Since Americans spend 90 percent of their time indoors, the buildings in which we work, learn, and live have a lasting impact on our overall health. Indoor air pollution from cleaning products and other sources can trigger respiratory

courtesy of the Alice Ferguson Foundation

The Morris & Gwendolyn Cafritz Foundation Environmental Center, a living building constructed by the Alice Ferguson Foundation.

problems like asthma as well as eye irritation, coughs, and headaches.

To the creators of the LBC, health and happiness go hand in hand. In addition to developing protocols for everyday operations like cleaning, and complying with high standards for indoor air quality such as the international ASHRAE Standard 62, design teams must also embrace the idea of biophilia, or the belief that human beings have a natural desire to interact with nature.

After receiving full LBC certification in April 2015, Seattle's Bullitt Center became the world's first certified living office building. The Center's project team used biophilic design as a fundamental principle guiding architecture, engineering, construction, and operation, says Denis Hayes, president and CEO of the Bullitt Foundation (and the founder of Earth Day).

"Our heavy timber structure wraps office spaces in warm, natural wood, and our large operating windows provide ample natural daylight as well as views of nature in the adjacent park," he says. "Our occupants have responded positively to these features and many others. We know people are more productive, as well as healthier and happier, when they are able to enjoy natural daylight and surrounding views, and the tenant companies have responded favorably."

• **Place:** To avoid disturbing their surrounding environment, living buildings do not occupy more space than they need. The LBC's Place Petal requires project teams to only select sites where there is already existing development and that aren't too close to sensitive habitats like wetlands, primary dunes, and virgin prairies.

Living buildings promote agriculture and participate in ILFI's Habitat Exchange program, wherein project teams match land space used for construction with purchased off-site space set aside for future habitat preservation.

Last June, the Alice Ferguson Foundation's Morris and Gwendolyn Cafritz Foundation Environmental Center became the 13th building in the world to earn complete Living Building certification. Located on Hard Bargain Farm in Accokeek, MD, the foundation aims to connect students to the natural world, sustainable agricultural practices, and the cultural heritage of the Potomac River watershed.

"Our goal in investing in [the LBC] is so that we could truly walk the talk. It's [also] to share what we have learned every day with the students that we serve who get to see this building in action," says Alice Ferguson Foundation president and CEO Lori Arguelles.

She says she hopes the thousands of students who visit the center each year take what they learn from the building back home with them: "Even if your home isn't a green building like this, it doesn't mean that you can't apply the principles of low water usage, or be conscious of your electricity usage, or think about composting and waste reduction through recycling."

• **Water:** Changing the way people think about water waste is a major principle of the Water Petal. Living buildings capture, purify, and recycle all the water they need to operate on site.

The Cafritz Foundation Environmental Center, for instance, sits on top of a well. The Center pumps well water for drinking, showering, and washing hands, and it purifies graywater on-site. Waterless toilets and urinal composting systems also reduce water usage. A subsurface irrigation system collects and returns waste water to the ground.

• **Energy:** The LBC requires that buildings use on-site renewable energy systems that meet 105 percent of a living building's energy needs, meaning that buildings must provide their own energy for everyday operation and then some. Projects usually meet the LBC's "net-positive" energy imperative by using renewable systems, often solar, that can feed excess energy back into the grid. They must also have batteries to store energy in case of an outage.

Seattle's Bullitt Center uses a 244 kW rooftop solar array to generate electricity. When the array produces more energy than needed, the excess energy transfers to the public utility grid, where it's accessed by other energy users. The Bullitt Foundation, which owns the building, receives credit and is able to pull energy from the grid in the winter when there is less sunlight.

• **Equity:** Many buildings are not constructed with people of various ages, abilities, and socioeconomic backgrounds in mind, but ILFI wants to change that. The LBC's Equity Petal requires project teams to follow ILFI design guidelines that are "human-scaled" not only in architectural design, but in equitable accessibility, too.

Living buildings include features for disabled individuals such as ramps,

sizable elevators, and windows that open to provide fresh air and sunlight.

The LBC also aims to construct buildings that are economically and regionally inclusive. ILFI recognizes that in order to achieve equitable access to nature and green buildings, outdated zoning standards that prohibit green-building practices, and private ownership that excludes communities from natural destinations and natural resources like clean air, soil, water, and lands have to change.

Home to three living buildings—the Bullitt Center, the Bertschi School Living Science Building, and McGilvra Place Park—the City of Seattle has reaped the benefits of evolving policy such as its Living Building Pilot program, which provides incentives for projects pursuing the Challenge.

"Throughout the project, the City of Seattle was an important partner, starting with the development of the Living Building Pilot Program," says the Bullitt Foundation's Hayes. "Such a policy framework is a critical piece of the puzzle, especially when you consider the Bullitt Center bumped up against dozens of codes and regulations—both proscriptive and prescriptive—that would otherwise have prohibited development of our forward-facing project."

For many communities outside of Seattle, the need for pro-green building policy reform is pressing. According to a report by the peer-reviewed *Environmental Health Perspectives* journal, low-income and minority communities in the US currently live with the worst built-environment conditions, which exacerbates health disparities.

"If a Living Building is only for the wealthy, it's not serving the vision of making a living future. We want everyone to have access to a living building," says Smith. "There are even some health care organizations and hospitals that are realizing … that the best preventative medicine and best way to reduce [health care] cost is to improve the quality of affordable housing."

- **Beauty:** The LBC's Beauty Petal isn't as much about looks as it is about effort. Living buildings do not have to subscribe to any particular aesthetic, but they should be designed to reflect the beauty found in nature.

For many living buildings, the idea of beauty transcends physical meaning. The Te Kura Whare building in Taneatua, New Zealand, the only certified living building existing outside of the US, features the vibrant works of Tuhoe artists. Finding inspiration from traditional Tuhoe symbols, proverbs, and the surrounding Te Urewera forest region, these artworks speak to both the proud history and promising future of the Tuhoe people.

A Living Future for All

There are currently 390 projects around the world that are pursuing Living Building certification, but only 15 fully certified living buildings exist today. (However, 70 more projects have been Petal or Zero Energy certified.) The time and cost it takes to achieve all seven petals make the construction of a Living Building a true challenge with many benefits for those who complete it.

The Alice Ferguson Foundation spent 11 years and $4.8 million completing the Morris & Gwendolyn Cafritz Foundation Environmental Center. The Alice Ferguson Foundation hopes to develop case studies and an institute for ecological studies to share the information it gathered during its journey to LBC certification.

Currently, ILFI is working with eight housing developers in Alaska, DC, California, Illinois, Texas, and Washington to make living buildings more affordable and accessible. ILFI's Affordable Housing Pilot Project borrows key principles from the Living Building Challenge to develop single-room, family, and mixed-use homes.

"Driving down the cost is in the policy advocacy we do," says Smith. "While something may cost more up front, the strategies you use to make a living building save money in the long run. If there are incentive programs or finances in place that cover the cost, that makes [the construction process] better."

Though persuading companies and local governments to invest in regenerative building designs might be an uphill climb, challenges seem to be ILFI's thing.

—Sytonia Reid

courtesy of the Bullitt Center

The Bullitt Center, a living office building in Seattle.

Climate-Friendly Fridges That Are Cool

It may not be "sexy," but refrigerant management is the solution with the greatest potential to help curb the climate crisis. Associate editor Eleanor Greene investigates how it could happen.

Refrigerant management is the most impactful step to solve the climate crisis, as many people on our staff were surprised to learn when we featured Paul Hawken's new book *Drawdown* in our winter issue.

We thought the top solution would be something environmentalists talked about more—like increasing wind and solar power or protecting forests. Even Hawken admitted that refrigeration management was "less sexy" than what he'd hoped would top the list.

But after reading *Drawdown*, I had to know more about the book and nonprofit's number-one climate solution. Instead of focusing on the need to phase out harmful refrigerants, I wanted to see how systems currently in development could help the world reach goals to reverse climate change.

The Problem of Refrigerants

The major issue with refrigeration (including both refrigerators and air conditioning) is the ozone-harming chemicals and greenhouse-gas chemicals that it releases into the air.

The 1987 Montreal Protocol, an international, legally binding agreement, phased out two types of harmful refrigerants in wide use prior to that year: chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), which were responsible for tearing a hole in the ozone layer.

Though they helped repair that hole, the replacement chemicals, hydrofluorocarbons (HFCs), are 1,000 to 9,000 times more potent than CO_2 in terms of their climate impact, and they are still in prominent use today.

Under the Clean Air Act, it's illegal to "cut the line" and release potent refrigerants into the air. But that's almost impossible to enforce when thousands of fridges arrive at landfills across the country every day. Eventually, 99 percent of refrigerant chemicals make it into the atmosphere.

Electricity is also a problem of refrigeration appliances. Unlike a washing machine, another high-energy appliance, people run their refrigerators 24/7, and as the world warms, more and more people rely on air conditioning to keep spaces bearable.

Green Coolants of the Future

New technologies for refrigeration have huge potential to help reverse the climate crisis.

Under the 2016 Kigali amendment to the Montreal Protocol, nations began to phase out HFCs. Subsequently, the chemical industry began to market hydrofluoroolefins (HFOs) as an Earth-friendly alternative to other gases, but they, too have harmful effects, says Janos Maté, a senior policy advisor at Greenpeace.

"When HFOs decompose in the atmosphere, they form trifluoroacetic acid, which is a toxin that accumulates in wetlands. This could bring about yet another global ecological disaster," he says.

Scientists are working on better alternatives. Magnetocaloric coolers are based on the thermodynamic effect, which shows that "the temperature of a material can be changed by exposing it to a magnetic field," explained journalist Michael Irving in *New Atlas*. These fridges cool by exposing an alloy to a magnetic field—certain alloys will heat up or cool down when this happens. Then, they pump low-impact liquids around the alloy, which cools the liquid so it can cool the fridge interior.

These coolers offer electricity savings of 20-30 percent over conventional systems, according to the

courtesy of Ben & Jerry's

Ben and Jerry's reduced its climate impact by bringing the first hydrocarbon freezers to the US in 2008. These freezers have a much smaller climate impact than conventional freezers.

Department of Energy. The appliance company Haier advertised a magnetocaloric cooler for residential use, but it is not yet available for purchase. General Electric estimated its magnetocaloric refrigerators could be available by 2019.

But a different kind of cleaner refrigerator is already on the market. In the 1990s, the advocacy nonprofit Greenpeace invented GreenFreeze as a climate-friendly solution.

GreenFreeze uses naturally occurring hydrocarbons, mainly isobutene as the refrigerant and cyclopentane as the insulation foam-blowing agent, or the foam that insulates the doors and walls of fridges. These efficient refrigerants are thousands of times less potent as global-warming agents than fluorocarbons and don't break down into acid like fluorolefins.

Nearly a billion GreenFreeze fridges are in use globally, says Greenpeace's Maté. "Hydrocarbons, along with the other natural refrigerants, are also used in commercial applications, such as vending machines, ice cream freezers, point of sale equipment, supermarket refrigeration, and room and building air-conditioning," he says.

Despite that, they're not yet widely available in the US, where the chemical industry used its powerful influence to stop the EPA from approving natural refrigerants for sale.

Despite the setback, Ben & Jerry's brought the first hydrocarbon freezer stateside in 2008, which the EPA allowed on a trial basis. In 2011, the EPA officially allowed manufacturers to sell natural refrigerants in the US.

Maté says that today, natural refrigerants can fulfill most of our cooling needs, and with economies of scale making prices competitive with conventional refrigerators, they could fulfill all of them.

In 2010, the UN's Technology and Economic Assessment Panel projected that by 2020 at least 75 to 80 percent of global new refrigerator production will use hydrocarbon refrigerants.

Better Refrigerant Recycling

According to *Drawdown*, 90 percent of the emissions of refrigerant chemicals happen during disposal. From 2007 to 2016, Americans discarded an estimated 175 million refrigerant-containing appliances, including fridges, freezers, dehumidifiers, and air conditioners, according to the EPA's Responsible Appliance Disposal (RAD) program.

Through partnerships with utilities, retailers, and states, RAD sends fridges to certified recyclers for proper disposal of refrigerants and foam-blowing agents and recovery of other materials.

Only about four percent of the discarded refrigeration appliances made it to RAD recyclers in that decade, and while others may have been recycled or sold on secondary markets, millions end up in landfills, where the focus tends to be more on reselling metals and less on proper disposal of harmful materials, though it is federal law that ozone-depleting substances and other harmful materials be disposed of properly.

Since 2007, RAD partners have recycled over 7 million refrigerators and freezers and nearly 52,000 air conditioning units, according to the program. Its greenhouse gas reduction is the equivalent of keeping 6.7 million cars off the road for a year.

Though refrigeration recycling is gradually catching on, the future of EPA programs is unclear with Scott Pruitt at the helm. Advocates consider Pruitt to be a threat to clean-energy programs but not necessarily recycling ones.

To recycle your old fridge, air conditioner, or humidifier through RAD, visit epa.gov/rad/

Smart Fridges Save Energy

Over time, using less electricity for refrigeration can have a big impact on climate. Smart fridges could help with that. Companies that make smart fridges promise these appliances will make our lives better, but for years, customers have scoffed at this manner of introducing one more screen into their homes. Less than two percent of fridges sold in 2016 were smart fridges, according to Statista.

Dan Saffer scoffs right back at the critics. He's a senior product designer for Twitter (meaning he works on the design of the social media platform itself), and he's an expert on interaction design and user experience. Saffer says it's not about the screen. It's about refrigerators that can be more useful than they are now—and save people money.

"The refrigerator is one of the biggest draws on electricity, so this thing will pay for itself, especially because the lifespan of refrigerators is 10 to 15 years," he says.

A smart fridge can learn your fridge-opening habits and cool at times that would be most efficient.

These fridges can also use

continued on p. 32

WHAT YOU CAN DO

- Maximize the efficiency of the fridge or freezer you have by keeping the coils clean and filling empty space in the freezer with jugs of water.
- If you need a new fridge, buy one that uses GreenFreeze/hydrocarbon technology. Find one here: cooltechnologies.org.
- Tell your supermarket and other stores to switch to climate-friendly cooling appliances.
- Responsibly recycle your old refrigerator and AC unit with the RAD program: epa.gov/rad/.
- Ask your representatives in Congress to mandate the early phase-out of HFCs where alternatives are available. Find contact info at congress.gov.

A change in refrigerant management [is] the single top solution for stopping global warming.

E-EDITION EXCLUSIVE

At Home with a Green Architect

Architect Bill Hutchins renovated his Maryland bungalow using green building techniques available today.

Bill Hutchins, principal architect at Helicon Works, inside his green home. Hutchins designed and oversaw a green whole-house renovation on the home. courtesy of Off Grid Quest

From the front, Bill Hutchins' small bungalow looks much like the rest on his street in Takoma Park, MD. But the 2,100 sq.-foot house Hutchins shares with his wife and their three children (with an apartment that they rent in the basement) is a green home, built with eco-friendly features and with environmentally low-impact practices that limit toxins and waste. To Hutchins, homes have the potential to have soul, especially when they're designed and built thoughtfully and with heart. He knows because he's both homeowner and architect, and he is also the owner of Helicon Works Architects. Hutchins incorporated elements in designing his home that have been available to consumers for years. Yet, it feels so different from a conventionally built home that it's clear green is still on the cutting edge.

Three Decades of Green

Hutchins started Helicon Works 28 years ago, when his young daughter's spirit for life made him realize his own had faded. He began to read poetry and essays about life's journeys, and from those, he saw "home" as something each person holds inside, which can be mirrored in the buildings they live in. Hutchins says his work as an architect is now that of "a poet who writes with space and form."

In fact, in March, Hutchins is publishing his first book, *Dwelling,* a collection of writings by Hutchins and others that is a "poetic exploration of home." (Learn more about it at *heliconworks architects.com/dwelling/*.)

Even before his daughter inspired him to reenergize the creative aspect of his work, he says he was always a green-minded person and architect. He grew up "playing in the dirt," literally and figuratively, and has long been aware of being Earth-minded in his life. When he started his practice, he incorporated new green principles as he discovered them, such as eliminating toxic formaldehyde and placing a priority on sustainably sourced wood.

In his entire three-decade journey as an architect, Hutchins says that designing and doing a green whole-house renovation on his own home was his "big bang" moment, where his thoughts and insights about how to blend his work with his values and his creative views on what makes a home "burst into clarity."

Inside the Hutchins Home

As you walk from the street to the main door on the side of the house, you can see it's not just a regular house. The exterior wall that's not visible from the street is painted green, purple, and bright gold. (He lives in a historic district and was not allowed to make changes to part of the house that was visible from the street during his renovation in 2006.)

The tiled stones on the walkway are courtertop fragments, flipped upside down, which he salvaged during a dumpster dive. The pavers in the mudroom and the back terrace are from Community Forklift, a nonprofit that sells surplus, gently used, and salvaged supplies for home improvement.

Even on a frigid day, the house is

warm, thanks to the corn-fired stove in the corner of the kitchen, the room at the center of the house. Using corn is cheaper than heating with oil and produces fewer greenhouse gas emissions. Every couple of weeks, Hutchins or his wife gets organic, locally sourced corn, purchased through a cooperative, for the stove from a pickup point. The stove uses about a bucket of corn per day in the winter.

The kitchen counter is splashed with color from salvaged mismatched tiles, and in the mudroom, closet doors came vintage from the Pentagon through Community Forklift. Buying salvaged materials saves money, and it also saves resources, compared to buying new doors or a slab of quarried marble for countertops.

The cabinet doors have a unique, sculptural look, which Hutchins said was achieved by cutting two-by-fours into wavy patterns, sanding them down, and nailing them together. Because they're made from whole pieces of wood, not compressed fibers, they're quite sturdy.

The Hutchins' addition to the historical part of the house included a kitchen and sunroom downstairs, and two bedrooms and a porch upstairs. But the walls on the addition aren't made of drywall—they were built using straw bale construction, a method that involves stacking up bales of straw and plastering it inside and out to protect it from the elements.

The processes of growing hay for straw and of making plaster are far less energy-intensive than acquiring resources for other building methods, and neither requires toxic materials. A straw bale wall can last just as long as conventionally built one and provides insulation at a lower price.

"It's cellulose, like wood. If you protect it and keep it dry, it will last as long as we will, maybe longer," Hutchins says. "For me, everything has to start with beauty. If it's not beautiful, nobody's going to want to do it. Fortunately, straw bale is a very beautiful way to build. These very thick walls just have a life force to them. A lot of the walls we live with and the food we eat

The garden-facing part of the Hutchins' home, which boasts a rain garden and collection pond.

courtesy of Helicon Works

The sunroom in the home's addition.

courtesy of Helicon Works

TAKE A DIGITAL TOUR!

Watch Bill Hutchins take Green America associate editor Eleanor Greene on a tour of his green home at **greenam.org/BillHutchins.**

have no life force, so this is a beautiful way to give a home vitality."

The result of the straw bale construction looks more earthy than conventional construction, especially in Hutchins' house, which volunteers helped build in exchange for lessons on green building practices. The plastering isn't perfectly flat, giving the walls a lively texture and unique style.

For the stair railing, Hutchins enlisted the help of Salvaging Creativity, a metal-working group in York, PA, that's part of the Helicon Works collaborative. Using sketches from Hutchins and salvaged metals, the company created an artistic railing and door handles in Hutchins' home without the impact of new metals.

Rain barrels in the backyard collect runoff for use in the garden. A collection pond captures water that would normally run downhill and pool in the basement, turning it into a habitat for birds and other animals.

"Storm water management is important in urban and suburban areas," says Hutchins. "We developed a holistic plan to keep all rainwater on our site—from the pond, to a bog, to a rain garden, to a trench drain under the driveway with pervious pavers."

There are areas in Hutchins' home that he'd like to make even more eco-friendly. He'd love to upgrade the front windows to better insulate the house, but he can't because of the historic neighborhood's rules. The rest of the windows, however, are salvaged from builders who bought too many and would have wasted them otherwise. Using "orphaned windows" saved Hutchins about $12,000.

Rooftop solar panels fulfill about 15 percent of the house's electricity needs. And overall, he's done what he can to make the home energy efficient.

"We created high-density living, with between five and eight people living here, and my wife and I work at home," says Hutchins. "Our energy use is high, but a lot happens here!"

He notes that his house is very well insulated. In fact, that's the green quality that has saved him the most money. The EPA estimates a well-sealed home with good insulation can save homeowners 15 percent on heating and cooling costs, but Hutchins admits he hasn't really kept track of exactly how much he's been able to cut down on his energy bills. He just does what he believes is the right thing to do.

courtesy of Helicon Works

Top left: Bill Hutchins designed the stair railing in his home, which was crafted from salvaged metal. Top right: The opened-up front gallery, with a doorway to the home's 2006 addition.. Bottom: The kitchen features a corn stove in which the Hutchins family burns organic, local corn to keep their home warm in winter.

Green with Heart

Though Hutchins' home is what most would consider to be green, he emphasizes it's far from perfect. Getting to green is a journey, he says.

"The thing about green building is that there are no right answers—there are shades of green. We're learning, and technologies are catching up. For me, it's about consciousness. If we have a consciousness and a heart to honor the Earth and each other, that's what we'll do."

—Eleanor Greene

Staying Connected the Old-Fashioned Way

Really not into smart tech? Consider these simple-but-innovative non-digital ways to stay connected without a device.

Smart devices can help us stay connected, but if you've been at a family gathering where everyone has their nose in a smartphone, you know that they can also contribute to isolation.

Sometimes, old-fashioned analog solutions can be the best way to strengthen relationships and form new ones in your community. Here are a few of our editors' new favorites.

aetb / iStockPhoto

A woman in St. Lambert, Quebec, uses a Little Free Library book-exchange box.

Celebrate Neighborday

For the past several years, *GOOD* magazine has designated the last Saturday in April as Neighborday, "a holiday all about getting a little face time with the folks who share your walls and fences."

How you celebrate is up to you: Leave kind notes in your neighbors' mailboxes. Bring them some yummy baked goods. Organize a neighborhood clean-up or a book or clothing swap. Or throw a block party and invite them all over for a barbecue or potluck.

Download *GOOD*'s Neighborday toolkit, register your event, and get ideas at good.is/guides/neighborday/.

Set Up a Little Free Library

Got a bunch of extra books on hand that you probably won't need again? Consider setting up a Little Free Library, which are popping up in cities and towns across the US.

To start one, all you do is buy or construct a box on your property—preferably at eye level. Then, pack the box with your old books and invite your neighbors and visitors to leave a book or take a book. Little Free Libraries have become so common that many people now recognize them on sight, so you shouldn't have to put a ton of effort into starting the process.

Little Free Libraries are great ways to share resources, and they can provide a catalyst for fun conversations about books with your friends and neighbors.

Get free building and installation plans at LittleFreeLibrary.org. The site also allows you to post your library on its world map, to help others find it.

Plant a Climate Garden for All

Green America's (Re)Store It! program aims to promote regenerative agriculture, a type of farming that builds healthy soil and turns it into a carbon sink. Now, you can get in on the action and get to know your neighbors by setting up a Climate Victory Garden for your community to share.

Any food garden can be a Climate Victory Garden (see p. 4). Inspired by the Allied Victory Gardens in WWII, these gardens turn the dirt in your backyard into a restorative, climate-cooling patch of healthy soil. All you have to do is use regenerative farming techniques like rotating plants, avoiding chemicals, planting cover crops, and more. Find resources to grow a climate garden at greenamerica.org/climate-victory-gardens/.

And get tips on turning your garden into a community garden from the American Community Gardening Association: CommunityGarden.org.

Install a "Bucket List" Wall

Started by artist Candy Chang, Before I Die walls are part of a global art project that invites people to contemplate their lives and goals, and share them with others.

Communities, libraries, museums, and other venues in 70 countries have created "Before I Die" walls. The premise is simple: You set up a chalkboard or set out some sticky notes near a wall and ask people to write down a goal or dream they want to accomplish in their lifetime.

"Each wall is created by local residents who want to make a space in their community to restore perspective and share more with one another. Each wall is a tribute to living an examined life," says the organization.

Chang released a book in 2013 with her favorite "Before I Die" responses, which include "… create a typeface of my own"; "…see where my Grandma grew up"; and "…stop being afraid."

To view more examples and apply for free resources, visit beforeidie.city.

Share Your Stuff and Skills

The *Green American* has featured several ways to swap goods and share talents in past issues—like swapping child-, pet-, or elder care; starting a meal co-op; launching a home repair team; or starting a community solar project. Find these articles at greenamerica.org/sharing. Have other ideas? Send them to editors@greenamerica.org, and we'll print them in a future issue.

—Tracy Fernandez Rysavy

Smart Homes & Privacy

Your computerized car can pinpoint where you are as you drive. Your wireless computer and phone have microphones and cameras that hackers could access. Your smart TV collects data on your viewing habits to better target you with ads. Smart home devices promise convenience, but they also carry the danger of whittling away at our privacy.

In addition to exercising care with connected, wireless devices for health reasons (see p. 18), it's important to keep privacy considerations in mind when inviting connected devices into your home, as well as when investing in smart-tech companies, and when developing policy (or contacting your Congressional representatives about it).

A 2017 report from the Internet of Things (IoT) Forum asserts that manufacturers should do the following to protect people's privacy: Only gather data with strong permission from customers. Be transparent about how they collect and use data. Keep explanations clear and simple, rather than vague. Delete data immediately once it's been used.

The report also notes that policymakers must get involved in privacy protection. "Relying on market forces alone to embed strong privacy practices in the IoT is a flawed approach," the report states.

In 2016, EU regulators created the General Data Protection Regulation (GDPR), to establish standards for data protection for products sold in the EU. US policymakers have been much slower to act. In March of 2015, the Federal Trade Commission (FTC) created a devision to study the links between smart devices and privacy. And this past August, four Senators introduced the bipartisan Internet of Things Cybersecurity Act, which would require devices sold in the US to meet minimum security requirements. It's not as robust as the GDPR, but it does ensure that devices include some security protections against hackers.

At least 42 states introduced more than 240 bills or resolutions in 2017 related to cybersecurity, including those that would instill mandatory protections from cyberattacks and rules for the disposal of data a company collects.

As US consumers wait for privacy laws to catch up with smart technology, it's important to take steps to protect yourself.

At Green America, we advise purchasing "more stuff" only when you need it. Simply put, it saves resources and money. Sticking with your older or analog technology has the added benefit of helping to preserve your privacy.

When you do purchase a smart device, take care to read data-collection notices. If the company doesn't give you control over whether and how your data is stored or used, think about whether you truly need that device. Turn off functions you don't need that are connected to the internet. Use strong passwords for your router and all devices, taking care to create a unique password for each one. (A password tracking program like LastPass (*lastpass.com*) can help you keep track of them.)

Also, don't use smart devices that come with a default, hard-coded password. Experts note that those are exceedingly simple for hackers to attack. Instead, look for devices that have at least a two-factor authentication process. What that means is that in addition to requesting a password, you'll need to provide a security key or a one-time code received via text or e-mail to access them. A thumbprint or eye scan works, too.

You can also look for the TRUSTe mark. Companies with this independent certification may display the mark on their devices, showing that they meet strong standards for privacy protection, transparency, accountability, and customer choice in the collection and use of personal information.

"Fridges," continued from p. 27

something called demand response to talk to local utilities to optimize its internal processes. Utilities give better prices for electricity used at off-peak hours. Through demand response, your smart refrigerator's computer will, for example, put off heating the coils (which keeps them from freezing) for a few minutes or hours so this energy-intensive function happens off-peak.

According to a 2013 report from the National Renewable Energy Laboratory, demand response implemented in refrigerators could save consumers $2 to $4 a month on their electricity bills.

This might not be enough to make the cost of buying the smart fridge worth it for a homeowner, but for a facility like a grocery store with dozens or hundreds of refrigerators, this could be game-changing.

Demand response is already in place in many industrial settings. When Great Lakes Cold Storage's instituted demand response in its refrigerated warehouse in Cranberry Township, PA, it saved nine percent on its electricity bill in the first month, and, over two years, lowered the bill by 58 percent.

Homeowners who are concerned about the effects of wireless devices on human health (see p. 18) may want to skip this feature. Right now, most smart fridge brands have not yet incorporated demand response, while customers can turn it on in WiFi-connected Samsung and LG fridges.

Looking to the Future

As outlined in *Drawdown*, a change in refrigerant management could save the world 89.74 gigatons of reduced CO_2 equivalent by 2050, the single top solution for stopping global warming.

From changing how our old appliances are recycled to how new ones will be made, options are already in place for reducing the impact of refrigeration.

This is a shift that for many can start at home when it's time to replace an appliance. To make the biggest difference, farmers, grocers, and anyone working with refrigeration commercially must prioritize climate.

—Eleanor Greene

Sharing the Shareholder Guide

[My partner] Jane and I commend you hugely for putting together your recent issue of the *Green American* [*Guide to Social Investing & Better Banking*, Fall 2017], with all its detailing on *how* to break up with your bank and not get screwed in the process. Ditto all the info on shareholder pushback, credit cards, and the page which charts the comparison between the S&P 500 and MSCI KLD Social 400 Index—an eye-opener.

I have ordered ten copies to take to my financial advisor and others in Princeton.

Daniel A. Harris
Princeton, NJ

TRACY: Thanks so much for sharing the *Guide to Social Investing & Better Banking*, Daniel. As always, anyone who wants to share our materials may always make copies for free. You can access the guide online at greenamerica.org/GuidetoSRI/.

Military Drawdown

I read the excerpts from *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming* in the Winter 2017 issue of the *Green American*. ["Climate Change: 100 Reasons for Hope"] It's so exciting to read about how we can avoid disaster by just increasing our efforts in areas we are already hard at work in!

I am a bit disappointed, however, in that Mr. Hawken and his colleagues do not mention the impact reduction in oil consumption by the US Department of Defense (DOD) could mean to our goal of reversing destructive climate change.

According to the Union of Concerned Scientists (UCS), our Department of Defense is the largest institutional consumer of oil in the world, despite their laudable efforts to use alternate fuel sources.

Just imagine the oil that could be saved if the DOD converted its military operations to only defensive ones, no offensive activities. No nuclear weapons, no drones, no intercontinental missiles (ICBMs).

This kind of change would significantly reduce the pressure on other energy sectors to reach the carbon reduction goals outlined in *Drawdown*.

Randy Converse
Madison, WI

TRACY: While Project Drawdown's solutions are crafted to be general enough that any person or entity can work on implementing them, you're absolutely right that the US military could make a big dent in our country's climate impact by reducing its use of fossil fuels. According to UCS, the military uses 100 million barrels of oil each year—ouch.

Green & Good for All

TRACY FERNANDEZ RYSAVY

While this issue highlights new technologies that may make our lives greener, it's important to remember that not everyone can afford new technology.

In some cases, sticking with what you've got makes sense in terms of saving resources and upfront costs. But if a device (or an entire green building) can save you money and help make your home greener and healthier in the long term, then everyone should have access.

For solar panels, smart thermostats, and other energy-saving tech, you can visit dsireusa.org, an online database of state-by-state policies and incentives for renewable energy and energy efficiency. (The site was formerly run by the federal government, but due to budget cuts, is now operated by the nonprofit North Carolina Clean Energy Technology Center.) Your local utility may offer rebates and other incentives as well.

In addition, a few nonprofits across the country have a mission of making green homes affordable. As our editorial fellow Sytonia Reid notes in her article on p. 23, buildings that meet and are certified by the Living Building Challenge (LBC)—earning full LBC or partial "Equity Petal" certification—must be built for the community and accessible to all. In addition to public living buildings built for education and events, some project groups are constructing affordable housing that meets the challenge.

The Make It Right Foundation, started by actor Brad Pitt, began in response to the news that FEMA trailers provided to victims of Hurricanes Katrina and Rita contained high levels of formaldehyde, a known carcinogen and suspected neurotoxicant. The foundation began building green homes with solar panels on their roofs for the victims. Today, it continues to provide green, solar-powered affordable housing in New Orleans; Kansas City; Newark, NJ; and the Fort Peck Reservation in Montana. The homes have Cradle-to-Cradle certification, meaning the building materials are healthy, eco-friendly, and can be recovered and reused at the end of a building's useful life.

Several other groups build green, affordable housing, like Enterprise, which constructs affordable eco-homes all around the country, focusing on walkable communities near public transit. And the Red Feather Development Group helps Navajo and Hopi tribes in Montana and Arizona find responsible contractors to pinpoint problem areas that are making their homes unhealthy and inefficient, and then the group funds renovations. It also runs DIY workshops and provides Starter Kits for those who want to take on some of the work themselves.

If you want to help beyond donating to organizations that provide affordable green housing, consider taking part in a Habitat for Humanity build (*habitat.org*). This national nonprofit makes its affordable housing green and energy efficient. And, its ReStores sell recovered building materials from renovations to the public.

—Tracy Fernandez Rysavy, editor-in-chief

Please send your letters to: Editors, Green America, 1612 K St. NW, Ste. 600, Washington, DC 20006. Or e-mail **editors@greenamerica.org**. Letters used in this column may be edited for length and clarity.
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Green America®
1612 K Street NW, Suite 600
Washington, DC 20006
www.greenamerica.org
202/872-5307 • fax: 202/331-8166

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