

Green energy is great for fighting climate change, but not using it is even better

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As head of Bridging the Gap, a nonprofit working on climate change and other environmental problems in Kansas City, Missouri, Kristin Riott has a lot on her plate.

There are the perennial challenges of litter and recycling in the city, the constant effort to coax the business community into better practices, and thousands of trees to plant.

But when it comes to the world's most pressing environmental crisis—climate change—the organization's primary tools are surprisingly simple. They don't require spending billions of dollars to remake the city's energy economy or even tens of thousands on [electric cars](#) and rooftop [solar panels](#).

Instead, staff members mostly just screw in new light bulbs and plug holes in the basements of homes across the city. They eliminate one draft, lower one [energy bill](#), and stop just a little bit of carbon from polluting the atmosphere, one home at a time.

"This is the low-hanging fruit," Riott said. "But it has the potential to play a huge role."

Riott is among a class of climate thinkers flying below the radar of national discourse.

The transition to a [clean energy economy](#) draws steady news coverage and social media chatter about innovations like Teslas, electric Ford Mustangs and renewables like wind and solar, which now provide about 20% of the nation's electricity. But while such technologies drive an essential transition to cleaner energy sources, studies show Riott's approach to lowering our overall energy use is just as important for avoiding the worst-case climate scenarios.

Making buildings fully energy efficient could drop [global greenhouse gas emissions](#) by as much as 14%, Riott said, citing work from McKinsey & Co., a global management consulting firm. The International Renewable Energy Agency, or IRENA, gives energy efficiency about equal weight

with renewables, noting that to meet international climate goals, the world will have to achieve an 11% decrease in overall energy use by 2050—while at the same time supporting billions in new population growth.

Efficiency is imperative to achieve that, said Jonathan Foley, executive director of Project Drawdown, a nonprofit that ranks the importance of climate solutions.

It's "not at all" possible to achieve the greenhouse gas reductions needed to avoid the worst climate catastrophes using only wind, solar, and electric cars, Foley said. In addition to decreasing energy usage in homes and businesses, the world has to increase efficiency in other sectors, such as food and transportation.

"In every one of these systems, we can make the current world we have more efficient," Foley said. "I like this combination of looking at all the things we touch and asking, how do we make this more efficient?"

But substantial hurdles stand in the way. As with other climate solutions, increasing efficiency can come with significant upfront investment costs. While sealing leaky HVAC systems and installing home insulation are inexpensive compared with buying an electric vehicle, employing a workforce of home energy auditors to evaluate the best option for each house is not. Commercial building retrofits are also more expensive.

Adding to the challenge is that, unlike a new Tesla or solar panel, there's no shiny object to show off to friends and neighbors. That can be a tough ask for societies built around consuming new products, said Dolf Gielen, director of the IRENA's Innovation and Technology Centre in Bonn, Germany.

"You don't see efficiency," Gielen said. "It's something you don't use

anymore, which is a bit of a strange concept."

Hidden costs

As the demand for electric vehicles and renewable energy heats up in the U.S., so too do the hidden drawbacks of the technologies, which require the mining of minerals and metals and lots of land. That, experts say, is why increasing efficiency to lower demand should go hand-in-hand.

As recently as 2018, electric cars and hybrids accounted for less than 4% of new car sales in the country, according to the U.S. Energy Information Administration. By the end of 2021, the figure had reached nearly 11% and is expected to grow to 45% by 2035, according to Statista, a market data provider based in Hamburg, Germany.

Applications to build commercial-scale wind and [solar projects](#) have grown at such a rate that the electric grid operators tasked with reviewing them are struggling to keep pace. Earlier this year, the nation's largest grid operator covering the Mid-Atlantic region proposed a two-year freeze on new proposals until it can clear an application backlog.

Additional bottlenecks abound.

A global shortage of microchips used in modern cars has snarled automobile production over the past two years. Some experts warn that electric vehicles, which rely on materials like lithium, cobalt, and nickel, could face similar headwinds in years ahead. Elon Musk, the CEO of Tesla, has said the price of lithium in particular has already risen to "insane levels."

Experts like Gielen say that, theoretically, there are plenty of the necessary materials across the globe. But efforts to extract them are lagging demand, can create environmental and socioeconomic concerns

of their own, and are subject to competition between major powers over supply chains, with China currently dominating processing.

"The resources out there are enormous," Gielen said. "The problem is that right now minerals processing also needs to expand rapidly."

Solar and wind energy face their own challenges. Despite those power sources having roughly quadrupled over the past decade, they'll need to do it again by 2035 to meet climate goals, according to the nonprofit Environment America.

Experts say that presents new difficulties. The U.S. has enough land, says Yoann Hispa, CEO of LandGate, a company that analyzes the energy potential of land and connects owners with companies seeking to develop projects. Their research shows installing enough wind and solar to achieve carbon neutrality will require about 1% of the nation's land—an area roughly the size of Kentucky. That's challenging but "doable," Hispa said.

However, projects are also butting up against an outdated energy grid and transmission lines, as well as local opposition to wind and energy projects. Such concerns have popped up from progressive towns on the New England coast to conservative rural communities in western Pennsylvania, where one township recently passed an ordinance attempting to prevent a solar project that could power 38,000 homes a year.

Hispa said his company helps to ease the friction. But he also understands why projects draw opposition in some locations.

"People live in the countryside because they like the countryside," Hispa said. "I was in Kansas driving to Colorado ... and I could not see the Rocky Mountains because there were so many turbines blocking them."

Efficiency, advocates argue, eases each of these burdens. Less energy demand means fewer wind and solar farms that need to be installed; more efficient food and transportation systems mean less reliance on vehicles of any kind.

"Efficiency should come first," Gielen said. "Because every unit of energy you don't use, you don't need to produce."

Hidden benefits

Already, the hidden benefits of efficiency are working in the background. Gielen notes that global efficiency efforts, particularly in leading nations like Japan, have helped to decouple energy use from global economic growth for the first time since the start of the industrial revolution.

"There is a continuous improvement in energy efficiency every year," Gielen said. "And one key reason why global energy use has more or less been flat while the economy has been growing is because of that."

Energy efficiency presents additional benefits at the local level, Riott notes.

The housing stock that benefits the most from weatherization is typically older and occupied by lower-income owners. Sealing up their homes leads not only to increased energy efficiency and decreased greenhouse gas emissions but better quality of life and health outcomes. Something as simple as planting a shade tree to block the sun from a home's facade can lower air conditioning demand while improving mental health and property values.

In one case, Bridging the Gap workers found high carbon monoxide levels while insulating a home. Holes in its exterior had actually saved

the occupants' lives. The organization dealt with both, enabling the homeowner and her disabled son to live healthier and stay warm in the winter.

Another resident had fallen on hard times, couldn't pay to repair his water heater, and eventually had his water service shut off. Riott's team worked to restore water, replace the heater with a more efficient one and realize savings on his bills going forward.

"He told our programs director, 'I'm washing my clothes, I'm cleaning my house,'" Riott recalled. "Everybody should have the right to do that."

Solutions, small and large

Efficiency solutions come in many varieties, from \$10 fixes by homeowners to massive investments by state and national agencies. Some are tantalizingly simple but require more buy-in from the public and government leaders to scale up, experts say.

The most affordable investments for homeowners are fixes like swapping out old light bulbs for newer, more energy-efficient varieties that last up to 25 times longer and pay for themselves in as little as nine months, Riott said. High-efficiency water devices, such as shower heads and faucet aerators, cost about \$11 and can pay for themselves by shaving \$15 off the next water bill.

For a few hundred dollars, residents can seal exterior holes, eliminate leaks in ductwork, and insulate "rim joists," the area where a house's wooden framework meets the foundation. If there are thousands of dollars to spend, upgrading older appliances like refrigerators, washers and dryers, and installing advanced heating and cooling systems like geothermal wells and heat pumps are among the options.

The best solution is unique to each home, which is why Riott says home energy auditors are also a major piece of the puzzle. But employing them costs money too. With hundreds of billions of dollars now flowing to the fight against climate change, Riott believes government leaders should direct more of it toward [energy efficiency](#).

"The only thing that gives me pause is the dollars. ... Where is the money going to come from?" Riott said. "It costs money, but the payback is enormous."

Governments can also promote efficiency through policy. Gielen said the Japanese are experts, promoting small houses, small cars, investments in [public transit](#), and the electrification of appliances, which are cleaner than those powered by natural gas. In Europe, higher gas taxes levied by governments mean residents pay much more for gasoline than Americans, but that has driven vehicles to become more fuel-efficient than their U.S. counterparts.

Foley, with Project Drawdown, knows it will be challenging to get Americans to adopt such measures, despite their benefits.

"It isn't sexy," Foley said. "Nobody is going to go, 'Wow, that's cool,' when you drive by with a smaller car."

But Drawdown's ranking of climate solutions reveals just how beneficial efficiency can be. The project has a plan it calculates could feasibly limit global warming to less than 3.6 degrees Fahrenheit, which the International Panel on Climate Change says is essential to prevent catastrophic outcomes. The top-ranked priority is reducing food waste. Improvements in refrigeration occupy the fourth and eighth spots, both above solar.

Reducing how much food we throw away cuts down on the amount that

needs to be grown and shipped, lowering greenhouse gas emissions. Making the refrigeration systems that transport and store food less leaky and more efficient adds extra benefit, says Manik Suri, CEO of Therma, a company that uses new technology to improve commercial cold storage.

Suri says with energy costs rising and climate change bearing down, and the demand for electricity and refrigeration expected to soar in the developing world, humanity just can't get away with inefficiency any longer.

"Why are lights running when no one is there, why are heating and air conditioning running full blast when nobody is in spaces?" Manik said. "That's the kind of stuff we could do in the 20th century when energy was cheap because the planet was paying for it. ... But look at all the weather events, all the changing weather patterns, all the human toll. It's going to get harder and harder to do inefficient things."

Foley sees a lot of potential for governments to make progress, particularly in U.S. cities and states, now that the Supreme Court has struck down federal efforts to combat [climate change](#) and Congress continues to falter. He notes local governments can still incentivize home weatherization, invest in public transit, update building codes, and in the case of California, require higher fuel efficiency standards on vehicles.

"I'd like to see more focus on that, and less on giant, sweeping legislation that never gets done," Foley said. "Let's at least get the 'Duh' things out of the way. Did we weatherstrip the windows?"

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