

Utilities: A time to choose

Some power companies are embracing the clean energy future. Others remain mired in the past. How EDF is fighting to bring them around.

A retired coal plant,
Charleroi, Belgium

6 Is the Paris climate deal working?

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Climate sentinels

Migrating birds instinctually time their arrival to when there's food to eat, but this cycle is threatened by climate change. Take the red knot, which migrates some 9,300 miles from South America to its Arctic breeding grounds. With Arctic snow melting earlier, insects are hatching sooner. By the time knot chicks hatch, the insects, a prime food source, are scarce. This is likely causing the birds' precipitous decline and it's yet another reminder that we must act now on climate change.



Voting for clean energy



IN THIS YEAR'S ELECTION, THE ENVIRONMENT hasn't been discussed enough. That's unfortunate because the stakes couldn't be higher. The United States must take bold action on climate—alongside China and other big emitters—to meet our Paris commitments.

Bold action is both necessary and doable, because a new energy future is close at hand.

Environmentalists like me used to talk about the future promise of energy technology, but now we need only point to the numbers, because it's already happening. In 2010, about 20% of new electric generating capacity was from renewable sources. In 2015, it was 67%. The price of solar panels has plummeted to one-fifth of what it was just five years ago.

Momentum toward clean energy—driven by technology and economics—is visible on rooftops and hillsides all over our country. But public officials can greatly hasten or hamper the march of progress. Last year, for example, the Nevada Public Utilities Commission voted to impose additional fees for rooftop solar, throwing many of the state's solar panel installers out of work (*see cover story, p. 8*).

Meanwhile, California is ahead of schedule in meeting its decade-old commitment to reduce its greenhouse gas emissions to 1990 levels by 2020, and the legislature has just voted for an additional 40% cut by 2030. California has outpaced the national average in GDP and job growth, numbers that politicians love to talk about.

The next president and the next Congress will have a crucial responsibility in hastening the clean energy future. The new administration should make it a priority to use existing laws, such as the Clean Air Act, to reduce pollution and spur clean energy. And congressional action to put limits and a price on carbon pollution is long overdue. As long as it is free to pollute, we are going to produce a lot of pollution. This shouldn't be a partisan issue. More utility-scale solar and wind installations are in Republican congressional districts than Democratic ones. The lower cost of clean energy provides a tremendous opportunity.

To help seize this opportunity and position the United States as a global leader on climate change, EDF is working to build nonpartisan alliances with conservatives, youth organizations, national security experts and conservationists calling for a Clean Energy Commitment—a call to action to cut air pollution and leave a healthier and better future for our kids and grandkids. Learn more at cleanenergycommitment.org.

Together with others we will rebuild the political center that is essential for passing strong environmental laws. With the right policies, even states that are heavily dependent on fossil fuels can make the switch, cost effectively, to clean energy, while creating many good jobs.

All of us, acting together, can ensure a safer, healthier, low-carbon future. We can help secure that future by voting for candidates who favor bold climate action. Make your voice heard on November 8.

Fred Krupp
EDF President



Environmental Defense Fund's mission is to preserve the natural systems on which all life depends. Guided by science and economics, we find practical and lasting solutions to the most serious environmental problems.

Our work is made possible by the support of our members.



On the cover: Renewable energy sources, like solar and wind power, are on the rise. That's good news in the fight for clean air and against climate

change. But some utilities are still stuck on polluting fossil fuels, and they're trying to hold back the solar future. *Solutions* senior writer Charlie Miller reports from the front lines of the battle for clean energy (*see page 8*).

Cover: Richard Gubbels

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FIELD NOTES



JOHN PAE

Rights-based management has helped the spiny lobster rebound.

Belize: a model for small-scale sustainable fishing everywhere

The Central American nation of Belize recently became the first country in the world to adopt a national fishing rights program for small-scale fisheries.

The Mesoamerican Reef—the largest barrier reef in the Western Hemisphere—hugs the Belizean coast and supports 500 species of fish. But overfishing and development threaten the reef.

In 2008, EDF teamed up with Wildlife Conservation Society and local partners to enlist fishermen, policy makers and managers in pilot

projects to help preserve the reef by ending the threat of overfishing. Fishermen were granted rights to fish in a designated area in exchange for helping monitor illegal fishing. In just a few years, fish stocks rebounded and illegal fishing dropped 60%—leading the government to roll out the system nationwide.

“The adoption of fishing rights will serve as proof to other countries that reforms can benefit both the environment and fishermen,” says Larry Epstein, EDF’s director for Mesoamerica.

Bringing back the big cat

In the eastern United States, deer-car collisions cause over 200 human deaths and 29,000 injuries annually. One possible cure? Research suggests the reintroduction of cougars will cull deer populations and reduce deaths and injuries.



SHUTTERSTOCK



BETTY

Don Cheadle on climate change

Oscar-nominated actor Don Cheadle has donated his considerable talent to record a radio spot for EDF on climate change. The spot is running on the 124-station Entercom Communications radio network, which generously donated the air time.

“We’re in the fight of our lives against climate change,” says Cheadle. “I do have hope, but hope without action isn’t worth much. We need leadership. EDF is providing a blueprint.”

Learn more and hear the radio spot at edf.org/cheadle.



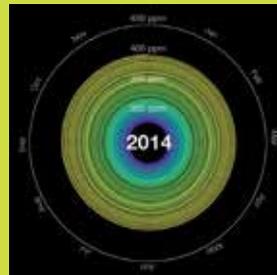
Grounds for optimism

A London-based company, bio bean, is turning used coffee grounds into biofuel pellets for heating buildings. The company is converting some 50,000 tons of grounds a year, and is researching how to convert grounds into biodiesel for vehicles. According to a study, if every Starbucks in the U.S. converted its waste, we could produce 1,825,000 gallons of biodiesel annually.

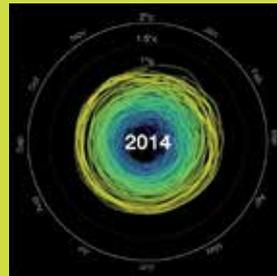
CLIMATE ANIMATIONS THAT SHOOK THE INTERNET

Climate scientist Ed Hawkins’ animated visualizations paint a compelling picture of the explosive way CO₂ emissions have driven climate change since 1850. Share now at bit.ly/2cGHHwB.

CO₂ EMISSIONS



GLOBAL TEMPERATURES



CLIMATE LAB BOOK (WWW.CLIMATE-LAB-BOOK.AC.UK/SPRALS)



SHUTTERSTOCK

The Golden State, a winner in reducing climate pollution.

California ups the ante on reducing greenhouse gas emissions

Ten years ago, California passed AB 32, the landmark Global Warming Solutions Act, which mandated that the state reduce its greenhouse gas emissions to 1990 levels by 2020. To meet that goal, the state created a cap-and-trade program that put a decreasing cap on carbon pollution for nearly 450 of the state's largest emitters. Standards were also set for cleaner cars and low-carbon fuels, which sparked innovation.

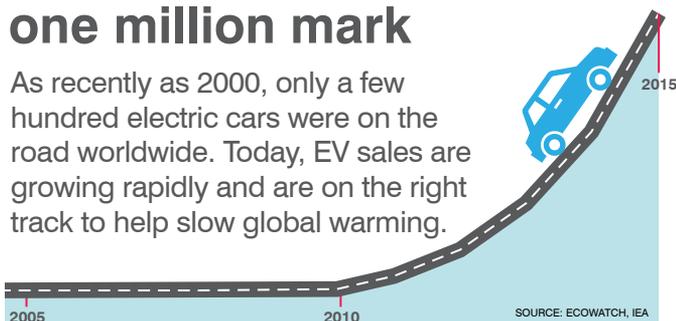
Today, the state is not only on track to meet its target, but expects to beat it. As a result,

the California legislature has embraced an even more ambitious goal, passing two bills (SB 32 and AB 197), committing the state to lowering climate pollution by at least 40% below 1990 levels by 2030.

EDF was a key player in the bills' passage. Working with the California Air Resources Board and diverse partners—including members of the business, faith, environmental justice and labor communities—we were able to win support from state legislators for the new greenhouse gas goals.

Electric cars hit the one million mark

As recently as 2000, only a few hundred electric cars were on the road worldwide. Today, EV sales are growing rapidly and are on the right track to help slow global warming.



THE LONG AND WINDING ROAD TOWARD SAFER CHEMICALS



What did it take to get a landmark chemical reform law passed in a divided Congress? Get a quick look at how EDF's decades-long advocacy resulted in a strong bipartisan law—and why it matters. Share the interactive visual now at edf.org/fewertoxics.



ISTOCK

Keep on truckin'—but tread lightly.

No more free ride: Cleaning up America's trucks and buses

It's time to clean up the nation's dirty truck fleet.

The U.S. Environmental Protection Agency and the Department of Transportation, strongly supported by EDF and other environmental groups, released new Clean Truck standards in August. They affect freight trucks, buses, tractor-trailers, heavy-duty pickups, vans and garbage trucks starting with the 2021 model year.

By 2027, EPA estimates, a trucker buying a new,

modernized vehicle will be able to recoup the additional cost in just two years, thanks to fuel cost savings. In addition, trucks sold under the new standards will, over their lifetime, keep more than a billion tons of carbon dioxide out of the atmosphere.

Consumers will benefit from cleaner and healthier air, and households will save an estimated \$400 every year in lower shipping costs by 2035, thanks in large part to truckers' lower fuel costs.



Is Paris delivering on its promise?

From Bengal to Beijing, the world is joining the clean power revolution.

Nearly a year ago, 195 countries made history by finalizing the Paris climate agreement to rein in climate change. What has happened since then?

WHEN WORLD LEADERS MET last year in Paris to hammer out a global climate agreement, the breakthrough deal reflected a fundamental shift in the dynamics between developed and developing countries. Instead of pointing fingers over who's to blame for the problem, the conference marked a new spirit of climate cooperation.

The Paris agreement has an ambitious goal: to bring down greenhouse gas emissions so that the rise in global temperatures is kept "well below" 2 degrees Celsius (3.6 degrees Fahrenheit), beyond which the most disruptive consequences of climate change kick in, and to pursue efforts to limit the temperature increase to 1.5°C.

That's a tall order, given that global temperatures continue to rise (2015 was the hottest year on record and 2016 is on track to beat it). But there are also signs of progress. Worldwide carbon dioxide emissions in 2015 didn't increase, for a

second straight year, despite sustained global economic growth.

Although the Paris agreement won't officially go into effect until 55 nations representing 55% of global emissions formally join the agreement, it is already changing the calculus. The United States and China, which account for almost 38% of world emissions, formally signed onto the agreement in September.

Ninety-one countries have expressed interest in using markets in their national plans to meet their emission reduction targets set in Paris. The market provisions offer a way to lower emissions efficiently by harnessing the private sector to deploy innovative solutions.

The momentum is undeniable. In China, where EDF helped design seven pilot carbon trading programs, Beijing is on schedule to roll out a national carbon-trading program, the world's largest, in 2017. The Chinese government is also investing heavily in clean energy.

In the United States, the cornerstone of the president's ambitious agenda is the Clean Power Plan, which established the first-ever national limits on carbon pollution from power plants. Although the plan is being reviewed by the courts, at least 19 states today are moving forward with plans to cut CO₂ emissions. EDF is part of a broad coalition defending the Clean Power Plan in court, including 60

municipalities, major power companies and industry giants like Google, IKEA and Apple.

Building on this progress, EPA is moving to cut methane pollution (*see next page*). Coupled with fuel economy standards for cars and trucks and a pledge to introduce new rules for aviation, the United States has sent a signal to other nations that it is serious about tackling climate change.

The transition to cleaner energy around the world is accelerating, driven largely by economics and the steep decline in prices for solar and wind. More than half of the global investment in renewable energy took place in developing countries, which are projected to account for the majority of future energy consumption.

For example, Morocco, the host country of this year's UN climate negotiations, recently switched on the first phase of a massive solar power plant in the Sahara Desert. When complete, it will be the world's largest solar facility, providing power for more than one million people.

"Leaders around the world have come to the realization that the path to shared global prosperity is a low-carbon path," says Dr. Nat Keohane, EDF's vice president for global climate. "Paris is delivering, but much more needs to be done."

Zeroing in on a potent threat

The Paris agreement has spurred the U.S., Canada and Mexico to act on methane, a powerful greenhouse gas. This could help the world reach its goal of holding global warming to below the 2° Celsius threshold.

ON JUNE 29, PRESIDENT OBAMA joined Mexican President Enrique Peña Nieto and Canadian Prime Minister Justin Trudeau at the annual North American Leaders' "Three Amigos" Summit in Ottawa to announce a comprehensive climate and energy pact. The leaders pledged to slash methane emissions from new and existing oil and gas infrastructure by 40–45% from 2012 levels by 2025 and to develop regulations for each country to meet those goals. EDF played a pivotal role in making this bold target part of the deal.

The three countries account for some 20% of global oil and gas methane emissions. "Canada, the United States and Mexico have a responsibility to lead—and they are," says Drew Nelson, manager of EDF's international work on methane.

EDF's oil and gas team staked out our North American strategy two years ago. We teamed up with local partners in Canada and Mexico to build political support and provide technical expertise to high-level policy makers in both countries. That work culminated in an analysis EDF presented a few weeks before the summit that found oil and gas methane emissions can be reduced 42% in North America for less than one cent per thousand cubic feet of gas produced.

"By building a rock-solid case for reducing emissions of methane, EDF has helped it become one of Canada's key climate solutions," says Ed Whittingham, executive director of partner Pembina Institute.

The oil and gas sector is the largest



Prompted by EDF, North American leaders pledged to slash methane emissions.

U.S. source of methane emissions and the largest industrial source globally. The International Energy Agency recommends global reductions of oil and gas methane pollution as one of five proven policy measures to enable the world to stay below the 2° Celsius warming threshold set by the recent Paris agreement.

Reducing methane is the fastest, cheapest way to slow the pace of warming.

Methane pollution from oil and gas production was barely on the radar four years ago, when EDF launched 16 field studies of leakage throughout the U.S. natural gas system.

The studies, which to date have yielded more than 30 papers published in peer-reviewed journals, revealed that emissions were much higher than EPA or industry had estimated. In 2016, EPA, responding in part to EDF's work, raised its estimate of methane emissions by 34% and committed to strong action.

We also laid a foundation for the economics of reducing oil and gas methane. In 2014, an independent analysis commissioned by EDF showed that 40–45% of methane leaks from the U.S. oil and gas industry could be eliminated at minimal cost within five years. Similar analyses sponsored by EDF showed that the

same targets were feasible for Canada and Mexico, and provided critical data for them to move forward.

Meanwhile, EDF worked with state leaders, local environmental groups, and major oil and gas producers in Colorado to develop the first regulations to address oil and gas methane pollution. Major oil and gas states Wyoming and Ohio soon incorporated key elements of Colorado's regulation into their rules.

In 2016, after a two-year national campaign that we led, EPA finalized national rules, modeled in part on states' regulations, to limit methane emissions from new and modified facilities. U.S. progress paved the way for Canada's and Mexico's commitments.

"Reducing methane is the fastest, cheapest means available to slow the pace of warming while longer term CO₂ reductions continue," says Dr. Ramon Alvarez, one of the EDF scientists who led the peer-reviewed studies.

When fully achieved, the North American commitment will reduce global oil and gas methane emissions by nearly 10%—a significant down payment on EDF's goal of achieving a 45% reduction by 2025. But commitments don't result in actual pollution reductions until regulations are put in place and enforced.

"North America's goal is a great first step, but implementation is key," says Nelson. "These regulations can provide the template for global action."

Dispatches from the energy front lines

By [Charlie Miller](#)



Electric utilities are making decisions today that will shape the future of energy production in America. The old ways of generating power are coming to an end, but some utilities have been slow to change, impeding progress toward the switch to clean energy. From Florida to California, the fight for clean energy, and against climate change is playing out.

IN 2011, DALE COLLIER, A 56-YEAR-OLD CARGO PLANE PILOT, decided to switch to solar energy. In sunny Las Vegas, where he lives, there were financial incentives and encouragement from local officials: He could reduce his electric bill and make money selling excess solar power to the local utility, NV Energy. What's more, he could help protect the environment.

After refinancing his home, Collier put 56 photovoltaic solar panels on his roof, at a cost of \$48,000. Almost immediately his electric bill dropped from \$330 to \$80 a month.

For four years, all went well. Then, last December, the Nevada Public Utilities Commission (PUC) voted to triple the monthly "basic service" fees solar owners pay to NV Energy, while slashing the amount they're reimbursed for the power they sell back to the utility. (PUCs are state appointed or elected oversight boards that regulate rates and services.)

Even more startling, the commission made the new rules retroactive. So 32,000 people like Collier, who already had solar, found themselves stuck with a deal that no longer made economic sense.

"It was the smartest thing I'd ever done," says Collier of his decision to go solar. But following the PUC's decision, he ruefully added that it was one of the "stupidest" things he had ever done.

The Nevada PUC defended its decision by arguing that solar customers are using the infrastructure the utility provides, but not paying for it. EDF and our allies argue the reverse is true—solar owners are subsidizing everyone else by providing the entire energy system with cheap power. In fact, studies show that residential solar has a negligible effect on rates and overall benefits utility customers.

After a furious backlash from solar companies and others, and at the urging of EDF and other advocates, Nevada regulators unanimously ruled to grandfather in rooftop solar customers so they keep their original rates until 2036.

This is good news for those like Collier—but the battle isn't over. Thousands of homeowners in Nevada who want to install rooftop solar may not get the same advantageous rates. More broadly, Collier's story is emblematic of a nationwide clash between regulators and utilities mired in the past and those embracing the clean energy future. EDF is at the center of the struggle to make sure clean energy thrives in this new world.

Stuck on coal

A poster child for utilities resisting clean energy is FirstEnergy, an Akron, OH-based company operating in six states. FirstEnergy is heavily reliant on coal and has aggressively fought plans in Ohio to increase energy efficiency.

In July, after a long fight with consumer

advocates, manufacturers and environmentalists, including EDF, FirstEnergy announced it will close four of seven units at its massive Sammis coal plant, which sits on the Ohio River a few miles from the Pennsylvania line. Built between 1959 and 1962, the units have been notorious sources of air pollution for decades.

The utility acquired obsolete coal plants like those at the Sammis facility at the very time natural gas was getting cheaper and electricity demand was falling, making the plants uncompetitive. In response, FirstEnergy is seeking a staggering \$9 billion bailout from customers.

"FirstEnergy made the mistake of buying coal plants at the wrong time," says Dick Munson, EDF's Midwest director of Clean Energy. "They made bad business decisions, and don't need or deserve a bailout." EDF is helping lead the fight against the bailout proposal.

Contrast that with Commonwealth Edison (ComEd), the largest utility in Illinois. ComEd is aggressively promoting energy efficiency among its customers and can furnish them with information on their energy use in real time.

With this data, customers will be able to adjust their energy use, such as by doing laundry during the time of day when electricity is least expensive. ComEd also became, in March, the first utility to measure its greenhouse gas emissions. Proposed by EDF and the Citizens Utility Board, an Illinois nonprofit, these

BY THE NUMBERS PENALIZING PROGRESS

420,000

workers are expected to be employed in solar by 2020 – four times as many as in 2010.

67%

of all new electric power capacity added in the U.S. in 2015 was wind or solar.

13

states proposed new fees for customers with rooftop solar in 2015.



Today, more people are employed in America's solar industry than in coal mining.

metrics will enable the utility to track progress in cutting emissions.

Another utility standout is Consolidated Edison (Con Ed) in New York, a state that is rolling out a sweeping overhaul of its energy system with EDF's support. The utility will distribute smart meters to millions of customers in 2017 to help them track their energy use, and is preparing for a future in which clean, distributed energy resources, such as rooftop solar panels and the storage provided by electric vehicle batteries, help form a cleaner electric grid.

Changing times

How did something like the Nevada solar decision happen to an industry that enjoys almost universal public support?

For one thing, the smooth integration of solar into the power grid is hindered by outdated regulations and tax policies that favor fossil fuels. EDF is working to get in place the right rules and incentives to encourage clean energy and spur develop-

ment of a modern electrical grid.

Then there is the basic business model of the nation's outdated power sector. For more than 100 years, encouraged partly by government regulations, utilities have built power plants and delivered power through infrastructure like substations and long-distance power lines. The more electricity the utilities sell, the more money they make. It's been an immensely successful business model, if you don't consider the environmental costs. Today, fossil fuel plants generate two-thirds of America's power, while electricity generation has become the single largest contributor to global warming.

But for some utilities like FirstEnergy,



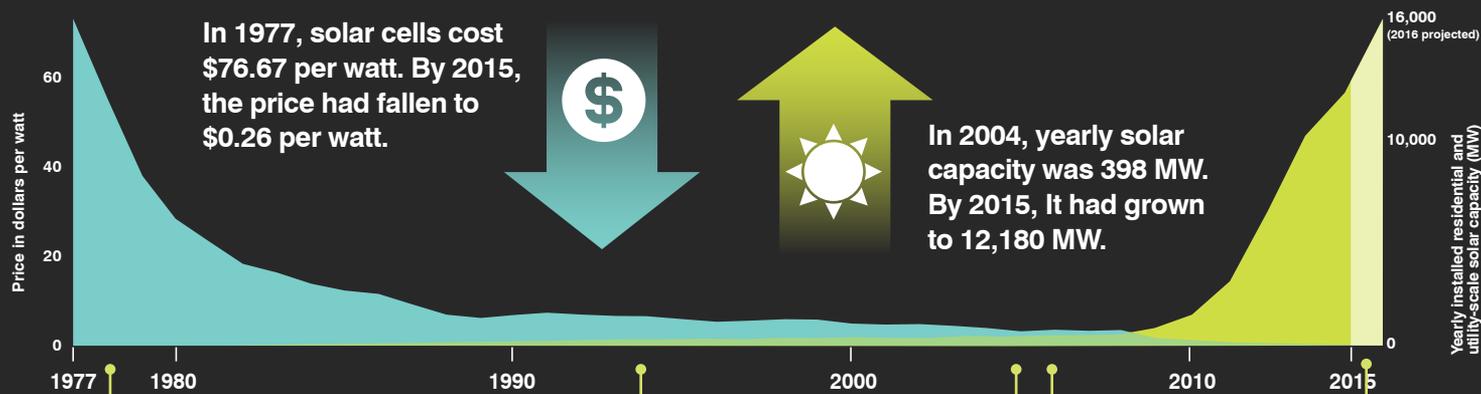
XCOTISI

You can't stop the sun.

residential solar power, which provides homeowners with their own mini-power system, is a threat—turning customers into competitors. Just as email disrupted the Postal Service's business model, so rooftop solar will disrupt utilities.

Utilities fighting the clean energy

THE STORY OF SOLAR POWER: PLUMMETING PRICES, SOARING DEMAND



1978 | First solar-powered village
A remote Native American community in Arizona becomes the world's first solar-powered village.



1994 | Breaking barriers
The National Renewable Energy Lab develops a solar cell that breaks the 30% efficiency barrier for the first



2005 | Powerful incentives
The Energy Policy Act is passed. It includes a 30% investment tax credit for installing new solar systems.



2006 | California leads
California approves the Solar Roofs Initiative for one million solar roofs.



2016 | Solar everywhere
Scientists create ultra-thin solar cells that can be used on anything wearable.



2016 | A major milestone
The U.S. celebrates the one millionth installation of solar energy nationwide.

revolution are missing out on a huge opportunity, says Lenae Shirley, EDF's senior director of Clean Energy. "Instead of just delivering electrons, the utilities of the future will deliver a range of services." Among these are household energy audits and maintenance of heating and air conditioning systems that could help consumers use less electricity.

In Texas, Austin Energy is sharply expanding solar while slashing emissions from fossil fuel plants. The utility already provides almost 25% of its power with renewables, including the ample wind power produced in the state, and is targeting 55% renewable energy by 2025. Charging stations for electric cars are popping up around the city and the utility offers a hefty rebate to homeowners who put up solar panels. Austin today emits the same amount of the greenhouse gas CO₂ as it did in 1990, despite a skyrocketing population.

Austin also has 20,000 jobs directly in the clean energy sector, a figure that's expected to grow at 11% annually by 2020. Nationwide, the solar industry added jobs almost 20 times faster than the national average in 2014. Solar workers make good money, too. An installer averages \$20 to \$24 per hour, and solar salespeople can make up to \$60 per hour.

These jobs are now at risk if utilities and their regulators stick with obsolete, polluting practices instead of welcoming clean energy. In Nevada, for example, the industry is still fragile. Within days of the PUC decision, the state's thriving solar industry dried up. One of the nation's largest solar companies, SolarCity, closed up shop and laid off 550 workers. Small business was hit hard. "My business disintegrated," says Rob Kowalczyk, who owned a rooftop solar company.

The usual suspects

Behind efforts to impede renewables like solar, look to the usual suspects. The American Legislative Exchange Council (ALEC), an industry-backed group that draws support from billionaires Charles and David Koch, has circulated "model" legislation to kill rooftop solar with fees and restrictions. In some states, sympathetic legislators have introduced proposed bills based on the ALEC bill.

In North Carolina, ALEC is fighting to repeal the state's renewable portfolio standard, a commitment to generate a certain amount of power with renewable energy. With strong backing from EDF,

the law cleared the General Assembly in 2007 with huge bipartisan margins.

Another state where entrenched interests are fighting renewables is Florida, which enjoys the nation's third-best rooftop solar potential. Yet, as state Rep. Dwight Dudley (D) tells *Rolling Stone*, "We live in the Stone Age with regard to renewable power. The power companies hold sway here, and consumers are at their mercy."

EDF takes action

Pushing back against the well-funded opposition, EDF is focusing on nine states—among them New York, California and Texas—that make up about half of the U.S. electricity market. Our goal: to create a system where utilities and homeowners can reap the full benefits of clean power.

"This is really about a revolution in the relationship between utilities and customers," says Adam Browning, executive director of Vote Solar, a policy and advocacy group based in California.

The clean energy cause is gaining support from across the political spectrum. In Florida, one of EDF's allies is a Tea Party group. "Who doesn't want to become an entrepreneur—selling energy generated on their private property to their neighbors?" says Debbie Dooley, director of Conservatives for Energy Freedom.

This entrepreneurial impulse aligns with the policy priorities of the Obama administration, which last year unveiled its Clean Power Plan. By 2030, the plan aims to reduce national electricity sector greenhouse gas emissions by one-third of 2005 levels. Renewables are to generate 28% of U.S. power—up from 7% today.

Still more changes lie ahead. Advanced batteries pioneered by companies like Tesla mean that solar energy can now be stored for days when the sun isn't shining. That eventually promises to make solar even more practical, as the cost of batteries goes down. Battery technology is gathering momentum, and costs are declining rapidly.

According to Jim Marston, EDF's vice president for Clean Energy, the victories for opponents of clean energy are likely to be short-lived, especially considering the rapid technological advances.

"The momentum toward renewable energy is unstoppable," he says. "You either adapt or get run over."

>>> READ MORE >>> edf.org/nycenergy



MATHEW GRIMM

Bringing the benefits of solar to all

Gloria Williams, 76, lives in Menlo Park, CA, on a very tight budget. She recently received a rooftop solar system, thanks to GRID Alternatives, an EDF ally that brings solar and job training to underserved communities. Realizing how solar power can save in energy costs, Williams, a great-grandmother, says: "This makes a big difference—I live on \$980 a month." Saving on utility bills is critical for people who need to make every dollar stretch. High electricity costs can mean less money for basic needs like food.

Solar creates good jobs, too. "Solar workers earn a higher-than-average wage, and the industry is making strides in employing more women, veterans and people of color," says Jorge Madrid, EDF's coordinator of clean energy partnerships.

The environmental and health benefits are clear. The majority of low-income, African American and Latino households live within 30 miles of a power plant and often bear the brunt of pollution. "Bringing solar online avoids building highly polluting 'peaker' plants and their associated health problems," says Madrid.

Financing, however, is a formidable barrier for low-income households. Although they represent 40% of the U.S. households, they have only 5% of solar installations. EDF promotes solutions that help defray high upfront costs. These include community solar and rooftop leasing programs that extend solar's reach to renters and people who cannot afford the cost of panels.

"I take pride in my rosebushes," says Williams, "and now in my solar panels, too!"

Making household products safer



The nation's largest retailer gets serious about removing dangerous chemicals from its products. The resulting ripple effect spurs other companies.

Working with EDF, Walmart is removing chemicals of concern from the products it sells.

WHEN MORE THAN 21,000 customers complained about hair loss and skin problems after trying a new line of WEN hair care products earlier this year, you might think the government would have swung into action. But all the Food and Drug Administration could do was issue an alert. It has only limited authority to regulate such products' ingredients.

In fact, health officials are frequently in the dark about what is in such products, or whether they're safe. And even when they know a dangerous substance is in use—for example, formaldehyde, an ingredient in some hair straighteners and other products, is a probable carcinogen—there is little they can do about it.

The disturbing news comes at a time of increasing consumer concern about the health effects of chemicals. That concern fueled the overhaul this summer of the 40-year-old Toxic Substances Control Act, a tremendous victory for consumers. EDF played a critical role in securing passage of the new legislation.

While EPA just got new powers to regulate chemicals in many household

products, personal care products are overseen by FDA, not EPA. For now, at least, the U.S. lags far behind Europe in ensuring the safety of chemicals used in these products. Europe has restricted many more chemicals from use in personal care products than has FDA.

Three years ago, EDF worked with Walmart on a Sustainable Chemistry Policy to begin tackling this regulatory black hole. Walmart, the world's largest retailer, began asking its suppliers to remove eight chemicals suspected of harming humans and the environment from products it sells. Formaldehyde was one of the eight.

EDF scientists had worked with Walmart to compile the list of chemicals from among thousands of possibilities. EDF advised Walmart to pick commonly used ingredients that were clearly harmful, according to the scientific evidence. We also worked to compile a much longer list of suspect chemicals that manufacturers should avoid as substitutes for any chemicals they remove.

The chemicals slated for removal are: butylparaben, dibutyl phthalate, diethyl phthalate, formaldehyde, nonylphenol ethoxylates, propylparaben, toluene and triclosan. These substances are used in both household cleaning and personal care products.

Removing these high-priority chemicals from Walmart's stores is just one

manifestation of EDF's wide-ranging partnership with the company, begun in 2006. EDF also has helped Walmart cut almost 36 million metric tons of greenhouse gases from its supply chain.

At present, Walmart's chemical policy covers household cleaning, baby, pet, personal care and beauty products sold at U.S. Walmart and Sam's Club stores.

The program affects about 90,000 items made by 700 manufacturers.

EDF and Walmart limited the initial list to eight chemicals in order to get the Sustainable Chemistry Policy underway quickly. "We knew it wasn't going to be perfect," said Zach Freeze, Walmart's director for strategic sustainability. "We wanted to get started." Going forward, EDF and Walmart are discussing additional chemicals and product categories.

So far, the company reports a 95% reduction by weight of the eight chemicals. This amounts to about 23 million pounds of dangerous chemicals removed from thousands of products. Customers at stores other than Walmart will find the safer products sold there as well.

"Walmart's chemicals policy demonstrates what is possible in the marketplace," says Dr. Sarah Vogel, EDF's vice president for Health.



CHRISTINA MITTENBERGER

Stopping the Amazon land grab



Dr. Stephan Schwartzman is director of Tropical Forest Policy at EDF. He works in the Brazilian Amazon to protect forests and indigenous peoples.

In dealing with Amazon deforestation, Brazil has always gone to extremes. What it's done right—and what it hasn't—can leave you dizzy. For example, deforestation in June 2016 was nearly double the June 2015 rate. This is disturbing. But let's not forget that, after reducing Amazon deforestation by 79%

since 2004, Brazil remains the world leader at cutting greenhouse gas pollution. The country was able to put the brakes on large-scale slashing and burning in large part because it recognized indigenous land rights and created protected areas along agricultural frontiers. These areas cover some 40% of the Amazon.

Indigenous people and traditional communities have protected their territories. But Brazil is also the world leader in murders of people who stand up to illegal loggers, gold miners or land-grabbers on the lawless Amazon frontier. This battle rages on, but there's plenty of reason for hope.

A growing network in Brazil believes that stopping deforestation isn't just good for the forest: it's also good business. They see Brazil as a future environmental superpower in a low-carbon economy.

Today, emerging carbon markets are poised to generate revenue for stopping deforestation. Major companies are demanding that commodities like soy, beef and timber leave forests intact. And Brazil has established a Forest Reserves market to reward good environmental performance. Illegal loggers aren't giving up, but the new network of environmental and business leaders are betting on a zero-deforestation future. My bet's on them.

>>> READ MORE >>> A new map brings together sellers and buyers of Brazil's sustainable products. See edf.org/BrazilMap.

Sierra Nevada: Feeling the burn



Drought and rising temperatures mean more forest fires. Scientists say some fires are needed but must be managed. edf.org/dyingtrees

Habitat exchange: Cause for celebration



USFWS approves EDF's habitat exchange program, unlocking millions of acres of private land for potential conservation. edf.org/habex

A place at the table

By Frank Convery, EDF Chief Economist

British Member of Parliament Rory Stewart observes, "Ours is a culture not of ancestor worship, but of descent worship. Our opium is our children." The evidence for this is epitomized by education: most parents try to ensure their children get the best education they can afford, giving them the intellectual and emotional resilience to manage an uncertain future.

But here we find a paradox. Climate change is among the greatest risks facing our children. But though we knock ourselves out to give them the best education possible, most of us pay scant attention to the future climate conditions our descendants will inherit.

There is an economic reason for this: The benefits of educating our offspring are direct. But when it comes to global warming, we need to work with others to produce a shared benefit, not just a private one. The good news is that 91 countries have expressed interest in using markets, a powerful and efficient method, to meet emission reductions targets set in Paris in 2015. And EDF is at the forefront in helping them deliver on their commitments.

A recent family holiday (which included granddaughter Grace, age seven) in the beautiful west of Ireland crystallized for me why this work is so important. Our mission is to bequeath, to every exuberantly curious seven-year-old of the future, a planet that still offers settings of natural beauty commensurate with her capacity for wonder.

>>> READ MORE >>> edf.org/wilson



GETTY

This regular column honors the memory of Robert W. Wilson, a longtime EDF supporter and champion of harnessing market forces to drive environmental progress.

Quiet heroes of the heartland

By Peter Edidin

They may lean right in their outlook and politics, but growing numbers of conservationists in America's heartland are making common cause with environmentalists and even the federal government. A new book explores this emerging movement.



THE MISSISSIPPI WATERSHED drains more than 40% of the continental United States. It's a landscape that holds much of the nation's natural wealth and produces most of its food: meat from its northern grasslands, grains and beans from its central plains, fish from its delta. It is the terrain explored by Lewis and Clark and the setting for Huck Finn's legendary voyage.

The watershed is also undergoing a quiet revolution. People who work its land and its waters are helping to restore America's threatened grasslands and farmlands, its fisheries and wildlife. Moreover, their stories are upending the erroneous assumption that heartland Americans are hostile to conservation, while also demonstrating that productive work does not always harm ecosystems and can even heal them.

So says EDF staffer Miriam Horn in her new book, *Rancher, Farmer, Fisherman: Conservation Heroes of the American Heartland* (W.W. Norton). The book takes readers with her on a 4,000-mile

odyssey, from the great ranches of Montana across the Mississippi River watershed to the farmland of Kansas, the coastline of Louisiana and the fisheries of the Gulf of Mexico.

Along the way, Horn describes the environmental degradation that threatens the heartland: The abundant grasslands and wildlife in the far reaches of Montana face ongoing threats from oil and gas exploration, development and invasive weeds; after generations of plowing, the rich topsoil of the Kansas farmland is depleted and eroding under a twin onslaught of drought and torrential rains; fertilizer runoff from farms within the watershed is creating a huge "dead zone" in the Gulf of Mexico. Climate change adds to the burden.

The heart of the book lies in Horn's profiles of five unlikely conservationists—each of whom is fighting to preserve a traditional way of life in uncertain times: Dusty Crary, a Montana rancher; Justin Knopf, a fifth-generation Kansas farmer; Merritt Lane, the CEO of a New Orleans-based shipping company; Sandy Nguyen, who works with the Vietnamese shrimping community in Louisiana; and Wayne Werner, a commercial fisherman in the Gulf of Mexico.

A sense of purpose and place

Horn's protagonists represent the thousands of men and women shouldering the responsibility of stewardship over the natural resources that sustain their

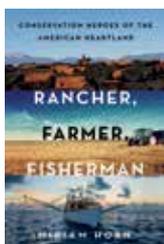
livelihood and sense of purpose. All, says Horn, are committed "to protect and pass along the self-sufficiency and beloved seasonal rituals their grandparents and great-great-grandparents built. And none of them think of the 'environment' as a thing apart, something to care about or not, but as the soil they plant their seeds into, the estuaries that nourish the baby fish, the cypress stands that shield them from storms, the storms themselves."

Horn's book explodes the common preconception that those who depend on natural resources for their livelihood cannot also be environmentalists. As Knopf puts it: "As a farmer, the natural resources are the most important thing to me."

Defenders of the land and water

Her subjects, Horn says, "turn out to have little in common with the cartoon versions of heartland citizens regularly trotted out to serve this or that political end. Crary, Knopf, Lane, Nguyen and Werner and their many partners tell a far more interesting story about what 'real Americans' care about and believe."

At times, Horn's heroes face strong opposition from their peers. Among Montana's ranchers, for example, there was suspicion and even hostility to Crary's attempts to involve government and environmental organizations in the protection of big, historic private ranches and federal wilderness. Nonetheless, he persevered, inspired by the natural beauty he was trying to protect. "I've got the



A new book by EDF's Miriam Horn introduces readers to some inspiring, uncommon, stewards of the environment.

Teton River and you look up there at those mountains, and it's all you need to keep going," he says.

Similarly, it took Werner years, and countless meetings with wary local fishermen, to help install an effective management system to save the Gulf of Mexico red snapper fishery from collapse. "I'd like to see this fishery rebuilt before I die," he says.

Rancher, Farmer, Fisherman paints a vivid picture of the American heartland and its people. Along her journey, Horn interviewed Crary while he was shoeing mules, rode for two 18-hour days on a combine harvesting wheat with Knopf, spent 24 hours with the captain of a

tugboat pushing barges up the Mississippi, and lived through a bad bout of seasickness while fishing for snapper in the Gulf of Mexico with Werner.

Horn was inspired by her 12 years at Environmental Defense Fund. EDF, she learned, seeks out relationships with people others might ignore or even scorn. To this day, there are few environmental groups that would work with, say, a conservative CEO of a large shipping company like Lane or an industrial-scale farmer like Knopf.

In the end, Horn's book, without minimizing the threats to working lands and wild places, is as optimistic as the five individuals she spent so much time with.

When asked to sum up what the men and women in her book have in common, Horn said: "All are courageous and passionate, with a strong work ethic and strong family ties across generations. They're willing to stand up for change, sometimes at great personal risk—with their family's livelihood on the line. They have no dogma or party line. Each choice is deeply considered, based on their generations of experience and everything they can learn from others. And they're constantly learning, rethinking their positions.

"They don't have a trace of sanctimony. Maybe that's what I love best about them."

ALONG THE RIVER: PROFILES IN CONSERVATION

The Mississippi River watershed drains more than 40% of the continental United States. In her new book, *Rancher, Farmer, Fisherman*, EDF author Miriam Horn delves deeply into the lives of some of the unlikely conservationists who live in this vast region and work to preserve the ecosystems they love and depend on.



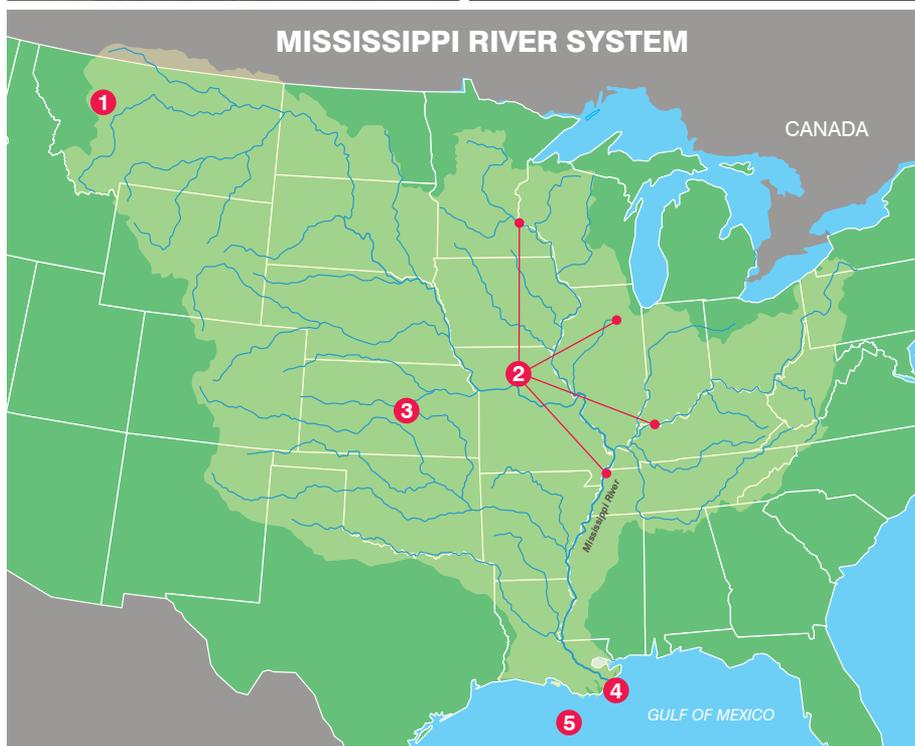
1 Dusty Crary's cattle ranch



2 Merritt Lane's Canal Barge Company



3 The Knopf family farm



4 Sandy Nguyen's shrimping community



5 Wayne Werner's fishing grounds

On the farm, thinking like an ecosystem

IN EARLY JUNE, JUST AS THE SUMMER season was starting, business owners and residents along Florida's "Treasure Coast," on the Atlantic Ocean, were outraged to find a toxic pea-green sludge coating their beaches and fouling the St. Lucie estuary. The slime drove away tourists, closed businesses and killed fish. The main culprit? Nutrient fertilizer runoff from sugar cane growers and cattle ranches upstream.

Unfortunately, algae blooms are not unique to Florida. There are also huge, fertilizer-driven dead zones in the Gulf of Mexico, the Chesapeake Bay and Lake Erie, choking marine life and threatening drinking water supplies. Excess fertilizer also escapes into the atmosphere as nitrous oxide, a potent greenhouse gas.

EDF is tackling the issue with a focus on corn, the biggest source of fertilizer runoff. The problem is that farmers often don't know exactly how much fertilizer to use, so they often apply too much. The excess not absorbed by the plant can be lost to air and water.

There are solutions. Using fertilizer more efficiently and improving soil health help keep agricultural pollutants out of the water.

For years, EDF has been working to make these farming practices the norm. We've helped farmers on 750,000 acres in 12 states cut fertilizer loss by an average



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Breakfast cereal and toxic green algae? That sounds like a concoction from a Dr. Seuss book, but growing corn is the biggest source of fertilizer pollution in the United States.

of 25%, while maintaining yields.

But to truly solve the problem, we needed a nationwide effort, so we engaged with Walmart, the nation's biggest grocer. Three years ago, Walmart asked its suppliers to find ways to reduce fertilizer runoff. Now, that work is taking off, thanks to companies in Walmart's supply chain.

Nearly 20 companies representing 30% of the U.S. food and beverage market have signed on to the initiative, vowing to improve water quality and reduce greenhouse gas emissions. Among them is United Suppliers (now part of Land O'Lakes), a cooperative whose members advise farmers growing corn and other crops on some 45 million acres.

"When I first heard about the Walmart fertilizer initiative, I was a bit worried

about our industry being blamed for environmental problems," says Land O'Lakes SVP Matt Carstens, "but then I dug into the issue and had conversations with EDF." That sealed the deal.

Together EDF and United Suppliers developed the SUSTAIN program, which advises farmers on best growing practices and tracks progress. The program has attracted a roster of big food companies, including Campbell's Soup, Smithfield Foods, Unilever and recently the Kellogg Company.

SUSTAIN aims to get 10 million acres in its program by 2020, a big down payment on EDF's goal of having half of all U.S. corn in sustainability programs by that year. Says Carstens: "Participating in this initiative is a triple win—for the environment, society and our business."

Your passions, your legacy

The extraordinary commitment of a few individuals gave us victory over the harmful pesticide DDT.

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A new day for Philippine fisheries



Combining fishing rights with marine reserves can revive fish populations and the communities that depend on them.

GROWING UP IN THE PHILIPPINES, Emilie Litsinger learned to dive in the waters off Verde Island. “I’ll never forget hearing the sound of dynamite blasts going off under water,” she says. “I saw firsthand how entire coastal communities depend on fishing for jobs and food—and how hunger and the race for fish drives desperate measures like dynamite fishing.”

After six years with EDF helping to implement fisheries reforms in New England, Litsinger moved back to the Philippines in 2014 with her family to direct our Philippines Oceans program. “I always dreamed of coming back,” she says. “This is my home.”

In the Philippines, an estimated 70% of fish stocks are seriously diminished, largely due to overfishing. The average catch per hook-and-line fisherman has dropped from 72 pounds per trip in the 1970s to seven pounds today. That’s in a country of 100 million people where more than half of the population relies on fish for sustenance.

To tackle the challenges of overfishing in small coastal fisheries, EDF is collaborating with the



Emilie Litsinger

University of California at Santa Barbara, which brings expertise in fisheries assessment and analysis, and Rare, a global leader in community-led conservation. The

partnership, called Fish Forever, has made great strides.

Working closely with local partners, Litsinger helped design three pilot projects to establish community fishing rights programs, known as TURFs, combined with marine reserves that help rebuild fish stocks. “We want to empower communities to take responsibility for conserving marine resources, taking into account their specific needs,” she says.

EDF knew that community buy-in is essential, not only to create reforms that last, but also to ensure the support of legislators, who must approve any reforms. So for 18 months, our site partners held dozens of meetings in each community.

On the island of Ayoke, a community of about a hundred families in Cantilan, residents established two ring-shaped TURFs around their island: Island fishermen are granted exclusive fishing access to the inner kilometer, while fishermen from other villages who agree to the rules, which include spawning closures and gear restrictions, are granted access to the outer kilometer. The reduction in fishing effort allows fish stocks to recover.

“We’d never been so included before,” said Analou Lumapguid, a local community leader. “After all those meetings, debates and even times when we were frustrated and in tears, we can now see the results of our efforts.” Sixteen other sites are now in the final stages of design.

To help guide the process, EDF’s Fishery Solutions Center, a leading resource for science-based innovation, has

created a comprehensive toolkit, including software that helps scientists assess the status of fish stocks. “The starting point is local knowledge gained through years of fishing,” says Dr. Rod Fujita, director of research and development for EDF’s Oceans program.

Globally, nearly half of the world’s wild seafood is caught by independent fishermen, as in the Philippines, operating boats within a few miles of shore. New research by EDF and allies, published in the Proceedings of the National Academy of Sciences, shows that with proper management fish populations could double by 2050, compared to business as usual.

“We are already seeing change happen in the Philippines,” says Litsinger. “In our lifetimes, if we work together we can have abundant fish in the water and vibrant, prosperous communities.”

 **85% of Filipino fishermen (1.4 million) are small scale**

 **\$3.3 billion of the nation’s revenues derive from fishing**

 **56% of animal protein in the country’s diet is from fish**

Ecotourism: How to green your next vacation

WHAT IS ECOTOURISM? THE journeys with the smallest environmental footprint are those that forego air travel and stick close to home. But for people traveling to distant places, The International Ecotourism Society (TIES), founded in 1990, defines ecotourism as “responsible travel to natural areas which conserves the environment and improves the welfare of the local people.”

It isn't enough to stay at an “eco-resort” that offers towel-reuse programs. And not every trip into the rainforest qualifies as green. But staying at a lodge built by local labor, using local materials and techniques, and offering employment to the community fills the bill. That's where rigorous certification programs come in.

Modern ecotourism certification dates only to 1987. But by 2002, there were already 60 certifying programs (that number grew to 80 by 2007). Some standards are relatively lax and set by trade organizations. Others are rigorous. The Sustainable Tourism Stewardship Council (with 1,000 organizations) has helped create a consensus on minimum standards.

The bottom line is this: do your homework on your destination, your travel operator and the certifications they cite. You're looking for an experience that benefits conservation and the local people and has a low impact on its environment. Here are some cool destinations that offer multiple certified ecotourism experiences:

■ Costa Rica

The country is rich in exotic flora, fauna and diverse environments—an eco-traveler's paradise (though the roads can be terrible!). Dr. Martha Honey, director of Harvard's Center for Responsible Travel, recommends Tortuguero. It's a remote national park on the country's Atlantic coast that boasts, among other things, four species of sea turtles that nest on the black sand beaches.



With a little research, you can enjoy nature while on vacation without harming it.

■ Cuba

This beautiful island—where EDF has worked for years to protect habitat and wildlife—includes no less than six UNESCO Biosphere Reserves and more than 200 protected areas with 350 bird and 35 mammal species. Restrictions on tourism remain, but travel to Cuba is becoming easier. The pristine, 850-square-mile Jardines de la Reina National Marine Park displays the richest stands of elk-horn coral and the largest shark populations in the Caribbean.

■ Ladakh, India

Bordering western Tibet, Ladakh is a high desert area abutting the Himalaya Mountains in the states of Jammu and Kashmir. It's a splendid destination from May to November (winters are too cold). Visit the lovely Hemis National Park, and enjoy hiking, whitewater rafting, camel

safaris and trips to see the abundant local wildlife. Ladakh has banned plastic bags, and sustainable farming practices are becoming widespread.

■ The Republic of Palau, Micronesia

Palau, with a population of only 21,000, is one of the world's best diving destinations. There are 500 species of coral and more than 1,400 species of fish. Adding to the diving experience is an abundance of underwater shipwrecks.

■ New Zealand

Kaikoura, on the east coast of the southern island, is a prime whale-watching spot and the first community in the world to become certified by EarthCheck, a global certification agency.

By Jim Motavalli

PRE-TRAVEL HOMEWORK

The International Ecotourism Society (TIES) answers the question, “What is Ecotourism?”: bit.ly/2cfPWyt

Sustainabletourism.net Complete list of ecotourism certification programs: bit.ly/2cfPWyt

NOAA listing of sustainable certifiers in the Americas: bit.ly/2bXZPCI

Tips on travel destinations from five ecotourism experts: bit.ly/2c7DFND

The Rainforest Alliance Certified lodgings from Mexico through South America: bit.ly/1HVQ8uN

For regulations on travel to Cuba from the U.S.: bit.ly/2bYowLV

Jim Motavalli writes regularly about environmental issues for leading publications. The opinions are the author's.

Letters

Saving the monarch's habitat

ISTOCK



EDF conservation biologist David Wolfe responds:

Illegal logging in the monarchs' overwintering habitat in Mexico has largely been eliminated due to efforts by Mexican authorities and partners to create new job opportunities and ways for locals to earn a living. Monarch scientists almost unanimously concur that the primary reason

A key reason for the monarchs' decline is the loss of milkweed.

Your article about the monarch butterfly (*Spring 2016*) caught my eye. The efforts to increase milkweeds by the Xerces Society and the Fish and Wildlife Service are encouraging; however, the forest in Mexico where the monarchs overwinter is being devastated by wood poachers. They want the wood, and the habitat is of no concern to them. Is that still happening and also one of the reasons for the decline in monarchs?

—D. Simons, Yukon, OK

for the butterflies' decline is loss of milkweed habitat, particularly in the Corn Belt of the Midwest. We at EDF are focusing on this threat through our Monarch Habitat Exchange, a program designed to address other threats as well, such as habitat fragmentation, loss of nectar plants and climate change. EDF scientists are keeping an eye on the status of the overwintering habitat in Mexico, and may devote more attention there in the future, if needed.

Decision 2016

A message to EDF members from Alicia Prevost, director, EDF voter mobilization



The coming election could determine the fate of the Clean Power Plan, which will reduce emissions from power plants. The election could also imperil fuel economy rules for cars and trucks, and EPA's rule for cutting toxic mercury emissions. EPA itself is in jeopardy. In Congress, there is talk of shuttering the agency.

Almost 90% of members of EDF Action, our political advocacy partner, say they'll vote. But beyond this committed group, many people still don't understand what's at stake. We need more people to turn out on Election Day 2016.

WHAT CAN YOU DO? THERE'S STILL TIME TO HELP

- ✓ You can use social media like Facebook to urge friends and family to vote for climate protection.
- ✓ Send a letter to your local newspaper, reminding readers of the importance of voting. EDF's online tool can help: edf.org/climatevote.
- ✓ Don't forget to vote yourself!

IN MEMORIAM

Tom Bell, war hero and environmentalist



During a bombing mission over Austria in 1944, Tom Bell, who died in August at age 92, learned a lesson that would serve him well over a lifetime of conservation. A burst of flak tore into his plane and nearly killed him. The lesson he learned is: Never give up.

"Tom was a conservation giant in the West, and a bona fide American hero with a Purple Heart and a Silver Star to prove it," says Jon Goldstein of EDF's Climate and Energy Team.

When Tom, who was raised on a Wyoming ranch, returned home from the war, he found solace in the state's natural beauty. But with time, he grew concerned that energy development was threatening Wyoming's wild open spaces.

So in 1967, he and his friends founded the Wyoming Outdoor Council (wyoming-outdoorcouncil.org). It's the state's oldest independent conservation organization and a key EDF partner. Together, we helped put in place Wyoming's rules to control air pollution from oil and gas wells. These rules form the basis of new national regulations from EPA and the Bureau of Land Management.

To give the environment a voice, Tom started *High Country News* in 1970. "I've spent most of my life trying to make sure that our special lands are conserved for the next generation," Tom said before his death. "I believe we need wild lands as places to retreat and to heal. We need them to feed our imagination and our spirit."

Tom Bell was a member of EDF since 1987.



“We can meet this challenge, and leave future generations the healthy, sustainable planet they deserve... This is personal.”

—U.S. Secretary of State John Kerry