

Next stop, Paris!

Strong new commitments by the U.S. and China raise hopes for progress. Inside: EDF's guide to the action.

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6 Standing up for clean power in the states

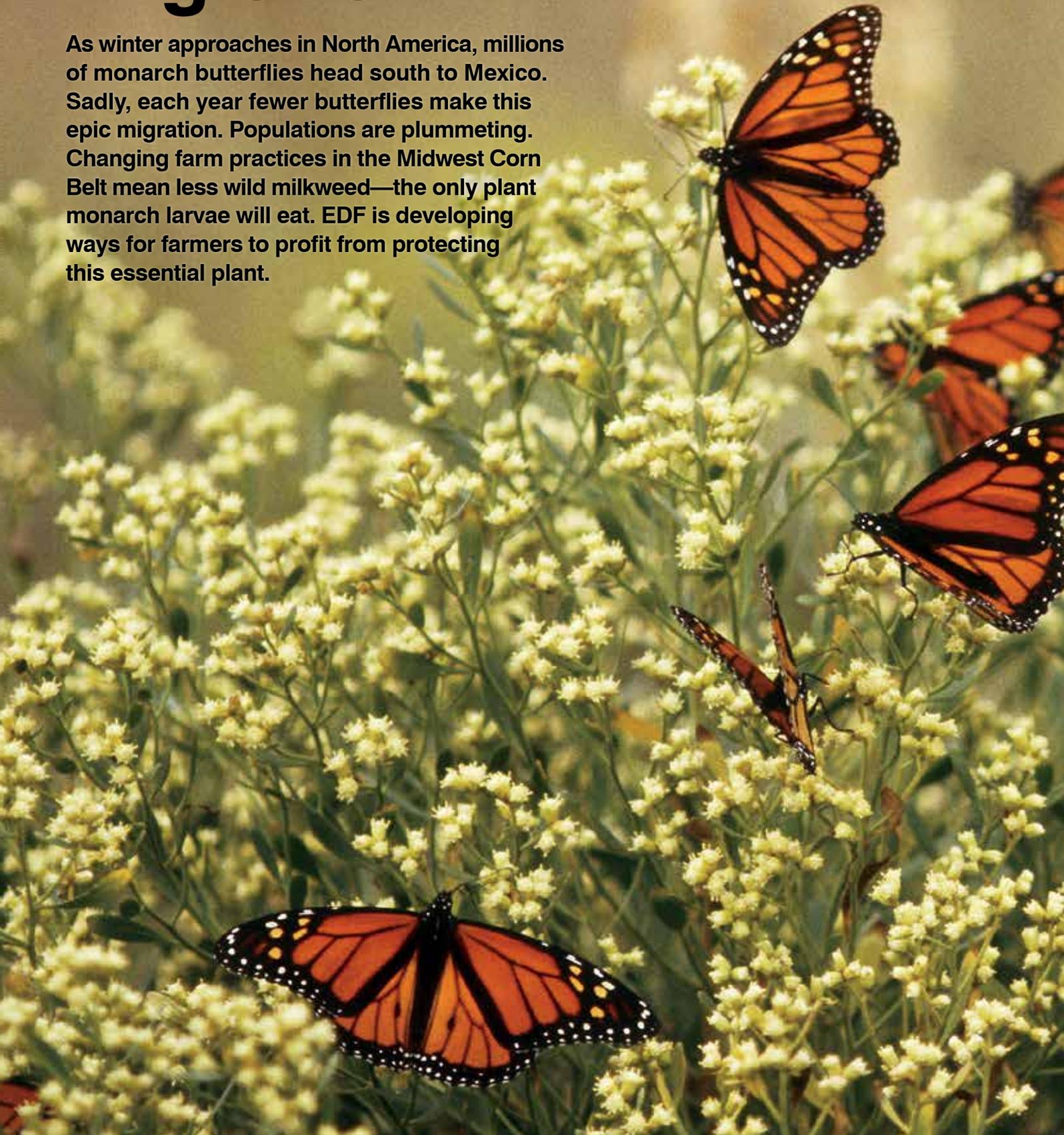
12 Shaking up Congress on toxic chemicals

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18 What you can do about all that ocean plastic

The gossamer migration

As winter approaches in North America, millions of monarch butterflies head south to Mexico. Sadly, each year fewer butterflies make this epic migration. Populations are plummeting. Changing farm practices in the Midwest Corn Belt mean less wild milkweed—the only plant monarch larvae will eat. EDF is developing ways for farmers to profit from protecting this essential plant.



Tracking the invisible



As I step off the curb to cross the street, a bike comes at me; I dodge it. You hear a speeding ambulance behind you on the road; you pull over.

Humans are hard-wired to respond to threats we can sense. But many environmental threats are not as obvious as urban smog or mine waste.

Increasingly, however, new sensor technologies are exposing what used to be invisible. Combined with new data analytics, they are transforming environmental protection by giving people the power to see like never before.

What if children's asthma inhalers could transmit their GPS location every time they were used? Now they can—and the data can be mapped to show asthma hotspots.

“I can tell you I didn't spray myself with any flame retardant.”

And here's another example. For a week this spring, I wore a wristband that absorbed chemicals I was exposed to in my daily life. The results, when they came in, were troubling. I can tell you I didn't spray myself with any flame retardant, but there it is in my wristband analysis—triphenyl phosphate—along with 13 other chemicals of concern, including plasticizers, combustion byproducts and a pesticide. As EDF's VP for health Dr. Sarah Vogel says, we need a national solution to the problem of chemical exposure, starting with a strong law to ensure the safety of chemicals in everyday products (*see story p. 12*).

Equally invisible to the naked eye is the methane pollution that's responsible for a quarter of the global warming we experience today. In August, the Environmental Protection Agency called on industry to cut methane leakage from natural gas facilities.

To fix leaks you have to find them. EDF has challenged inventors around the world to design low-cost, real-time methane detectors that could maintain a constant vigil at every natural gas facility (*see story p. 7*).

Even in remote parts of the world, technology is opening our eyes. Improvements in satellite technology, for instance, have enabled groups like the World Resources Institute to accurately track deforestation rates in Brazil and Indonesia. Verifying greenhouse gas reductions will be an important part of any international climate agreement (*see story p. 8*).

As technology improves, sensors get even smaller and costs come down, it will give people the power to see as never before. And, as John Amos of the nonprofit group SkyTruth likes to say, "If you can see it, you can change it."

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: As the world faces the growing risks of global warming, diplomats will soon converge on Paris to attend a U.N. conference on climate change, with the goal

of devising a plan to cut emissions. It's been a long road, and our cover image depicts the cities that previously hosted climate talks. But for the first time in years, there is hope for real progress.

Solutions writer Charlie Miller offers an insider's guide to the action.

Cover illustration: Leland Goodman (suitcase photo: Getty Images)

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FIELD NOTES



EMILIE MATSON

Much of the drilling in the West occurs on federal and tribal land.

Methane leaks shortchange tribes

When methane escapes anywhere, it's bad for the climate. When it leaks on public and tribal lands, it's bad for taxpayers and Native Americans, too.

A study commissioned by EDF found massive amounts of natural gas (mostly methane) emitted through burning, venting and leaks at drill sites on public and tribal lands in the West. In 2013 alone, the emitted gas was worth almost \$330 million, translating into millions in royalties lost to the federal government—and hence to

taxpayers. Scientists calculate that 25% of the global warming we're seeing today is caused by methane emissions. EDF is working to find and plug the leaks.

Some drilling in the West occurs on Native American land. In Utah, much of that land belongs to the Ute tribes.

Losing royalties is something the tribes can ill afford. Poverty and unemployment are all too common on the Northern Ute reservation.

"The cost of leaks is high, in many ways," says EDF attorney Tomas Carbonell.



NICK AMATI

A PEACEFUL USE: CAN DRONES HELP GROUSE?

Sage grouse were once a common sight in the West, but their numbers have dwindled due to habitat loss and catastrophic fires. A new tool could help: drones, which scientists are using to help monitor restoration of grouse-friendly habitat after wildfires.

“Less money spent on fuel means more to invest in our products, processes, people and communities.”

—PepsiCo Chief Executive Indra Nooyi in a *Wall Street Journal* op-ed coauthored with Fred Krupp on why energy efficiency is good for business



EPA

Student leaders representing 1.2 million college students gathered in Washington in June for the first-ever White House Youth Climate Conference. EPA Administrator Gina McCarthy (front center) and other top officials urged them to inspire America's youth to take action on climate change. The event was sponsored by Defend Our Future, a youth initiative of EDF.

BY THE NUMBERS POLLUTION'S HEAVY TOLL ON MINORITIES

71%

Percentage of African Americans who live in counties that violate federal air pollution standards; compares to 58% of whites.

47%

How much more prevalent asthma attacks are for African Americans vs. whites.

1 in 2

Hispanics who live in counties that frequently violate standards for ground-level ozone.

SOURCES: NAACP 2012 REPORT, ALA 2012 REPORT, CDC 2011 REPORT

Help EPA get rid of toxic mercury now!



The Supreme Court ruled this summer against EPA's Mercury and Air Toxics Rule, which slashes mercury and other air pollutants from coal-fired power plants. Yes, it's a setback, but not a defeat. EPA expects to swiftly address the Court's concerns.

»»» TAKE ACTION »»»

Let EPA Administrator Gina McCarthy know you're ready to fight for these vital air standards! Go to edf.org/slashmercury.



ISTOCK

Time to clean up a high-flying polluter.

Cleaner, friendlier skies

If aviation were a country, it would be the world's seventh-largest climate polluter. What's more, if left unregulated, its CO₂ emissions could quadruple by 2050 as new jets take wing. EDF supports EPA's proposal, launched this summer, to draft carbon standards for aircraft. "Efficiency standards are an important piece of the cleaner skies puzzle," says EDF international counsel Annie Petsonk.

But given the industry's expected growth, even tough U.S. efficiency standards can't curb aviation's global carbon pollution. "That's why EDF is also deeply engaged in getting governments, through the International Civil Aviation Organization, to cap the carbon pollution of all international flights, and use carbon markets to help airlines meet that cap cost-effectively," says Petsonk.

AN ONLINE CAMPAIGN COMBATS THE LIES

The American Petroleum Institute has been running ads against EPA's new smog rule, continuing the infamous practice of corporate lobbyists claiming industry's activities are not harmful. We ran this ad to shed light on the dirty truth.



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your will or trust.

Learn how:
877-867-7397 toll-free
legacy@edf.org
edf.org/legacy



Keep on truckin'—but tread lightly

The average tractor-trailer gets a dismal six miles per gallon. Proposed federal standards for fuel efficiency will drive up mpg closer to nine and improve on 2011 rules that cut greenhouse gas pollution from big rigs and buses, in part thanks to EDF's efforts.

BENEFITS OF THE PROPOSED RULES BY 2035 INCLUDE:



139 million
tons of carbon pollution kept out of the atmosphere annually, the equivalent of closing 33 coal-fired power plants



9.3 billion
gallons of fuel saved annually, which is nearly equal to our 2014 imports of oil from Iraq and Kuwait



1,200
lives saved annually by dramatically reducing harmful ozone-forming pollutants*

* FROM BOTH PHASE I AND PHASE II STANDARDS. SOURCES: EPA, DOT

Decisive climate battle moves to the states

SHUTTERSTOCK



Opponents may sue, but in the heartland the transition from dirty coal to clean energy is already under way.

EDF mobilizes support across the nation for EPA's Clean Power Plan.

PRESIDENT OBAMA MADE HISTORY on Aug. 3 when he unveiled the Clean Power Plan, the first-ever national standards to cut carbon dioxide pollution from existing power plants. Fossil fuel plants cause roughly a third of U.S. greenhouse gas emissions, more than any other source.

"There was tremendous energy in the East Room," says EDF president Fred Krupp, who was at the White House for the announcement, "similar to what I saw when George H.W. Bush announced the acid rain program in 1990." That landmark bill, based on EDF's work, has cut sulfur dioxide pollution by 76% since 1990.

The new rules require the nation's

power plants to cut their carbon emissions to 32% below 2005 levels by 2030. EDF joined allies like NRDC and the American Lung Association—in the courts, in outreach to key policy makers and with the public—to ensure the final rules were strong. EDF members played a key role, submitting 481,000 public comments, more than any other group.

The Clean Power Plan will provide \$34–54 billion in health and climate benefits by 2030, in part by reducing illnesses caused by air pollution. EPA estimates that by 2030 the plan will cut \$8 a month from the average residential utility bill and create tens of thousands of jobs.

The fight, however, is far from over. Senate Majority Leader Mitch McConnell (R-KY) has declared his intention to "do everything I can to fight" the regulation, urging all states to boycott the rules. The opposition has assembled a huge war chest, and 17 states have filed lawsuits, claiming the plan will irreparably damage the economy.

"We're in for a political fist-fight," says Jeremy Symons, EDF's associate VP for climate, "but we're confident we'll prevail." EPA's authority to act was established in a series of court cases in which EDF played a key role, including at the Supreme Court.

Many power companies and states have made clear they can meet the standards. In fact, 40 states have decreased CO₂ emission rates by an average of 18% between 2008 and 2013. They

are demonstrating that it is not only possible to reduce carbon pollution, but economically smart to do so.

Under EPA's plan, "states are in the driver's seat," says EDF general counsel Vickie Patton. EPA has provided states with tremendous flexibility to deploy solutions that reflect their local priorities in achieving the required emissions reductions. States that decline to come up with a plan will be subject to a federal plan. EPA has a responsibility under the nation's clean air laws to protect the health of all Americans from harmful air pollution. EDF is working in key states such as Colorado, Illinois, Pennsylvania and Texas to show that clean technologies and energy efficiency are cost-effective.

"The rhetoric is out there that the Clean Power Plan is bad for business," says Mark Buckley, vice president for environmental affairs at Staples, "but that is absolutely not the case." Staples is one of 365 companies to send a letter to governors requesting timely finalization of state implementation plans.

EDF is also working with leading utilities such as Xcel Energy to make the transition from dirty coal to clean energy and serve as a model for other utilities. "While no single step will fix climate change," says Krupp, "the Clean Power Plan is a catalyst for innovation and more pollution reductions in the future."

>>>TAKE ACTION >>>

Write your governor. Urge him or her to develop a state plan for clean power. Go to edf.org/statecleanpower.



"My administration is committed to making the Clean Power Plan work," says Pennsylvania Gov. Tom Wolf, whose state gets a third of its electricity from coal.

EPA targets methane leaks from oil and gas



Too few companies have acted to control methane, a potent greenhouse gas. New federal rules, developed with EDF's help, will take aim at these fugitive emissions.

LIFE-THREATENING HEAT WAVES AND record drought are not what people typically associate with methane—the main component of cheap, plentiful natural gas that generates electricity and heats many homes. Yet this invisible gas is responsible for a quarter of the warming we are experiencing today.

Shortly after finalizing the Clean Power Plan (*see story p. 6*), EPA followed up on Aug. 18 with another major step forward on climate—a proposal for the first national standards to control methane pollution from oil and gas operations. The proposed rules target emissions from new and modified operations and will help the nation meet the White House

goal of cutting methane emissions from the industry by 40–45% from 2012 levels by 2025. EDF pushed for strong nationwide standards and showed that this reduction is achievable at low cost.

For now, the proposed rules do not cover existing facilities. “That clearly doesn’t begin to address the majority of the problem,” says Mark Brownstein, who leads EDF’s oil and gas team. Existing facilities will still account for 90% of the problem in 2018.

“This is an important step forward,” says EDF president Fred Krupp, “but it must not be the last. More action is needed.”

Even the release of small amounts can undermine the climate advantage of natural gas over other fossil fuels. When leaked or vented along the oil and gas supply chain, natural gas is 84 times more potent a greenhouse gas than carbon dioxide over a 20-year time frame. Cutting emissions globally by 40–45% would have the same climate impact over 20 years as eliminating carbon pollution from nearly 1,000 coal-fired plants.

“Reducing methane emissions is the most effective action we can take today to slow warming over the next several decades,” says EDF chief scientist Dr. Steven Hamburg. Thanks in part to EDF’s leadership, this once-ignored issue is now on the map.

It all began when Hamburg alerted Krupp in 2010 about the urgent problem and paucity of data on emissions. EDF’s oil and gas team swung into action. Krupp was invited to serve on then-U.S. Energy Secretary Steven Chu’s natural gas advisory board, and in 2012, we launched a series of 16 research projects, whose findings are being published in peer-reviewed journals. Researchers measured every step, from wellheads to the gas lines running under streets. The results have been instrumental in informing state and federal action.

The latest study, published in *Environmental Science & Technology*, shows that leakage from some sources is worse than previously thought: Facilities that gather natural gas for processing across the United States emit roughly eight times official estimates.

Despite claims by industry trade groups that the new regulations are too expensive, EDF has identified many low-cost solutions such as replacing leaky valves. A separate study commissioned by EDF found that industry could repair nearly half of methane leaks at a cost of less than one-half of 1% of the market price of natural gas.

“This is not rocket science,” says Brownstein. “It’s more like auto mechanics.”

Colorado, Ohio and Wyoming, which have enacted rules to curb pollution from oil and gas operations, are already showing that strong standards need not come at the expense of jobs or production.

Still, it would be far easier for oil and gas companies to reduce their pollution if they could continually monitor for leaks. Today, oil and gas operations are rarely checked for leaks.

To find a solution, EDF’s Corporate Partnership Program challenged inventors around the world to design inexpensive real-time methane detectors. The winning designs are now being tested. In the not-too-distant future, methane detectors may be as ubiquitous as smoke alarms are today.



EDF's latest study reveals that methane leaks from some types of facilities are much worse than previously thought.

The Paris climate

Tips from EDF's experts on navigating the international climate negotiations. What to watch and how to



By Charlie Miller

AT A GLANCE

Negotiators from 195 countries

More than 50,000 participants are expected including scientists, environmental groups and delegates. It will be the most concerted effort in six years to rein in global warming.

The stakes couldn't be higher

The planet is getting hotter—2014 was the hottest year on record, and 2015 to date is even warmer. The pressure is on for nations to act.

What's new

Leadership from the U.S. and China, dramatically falling prices for wind and solar, and strong commitments from business are making more aggressive carbon reduction targets possible.

talks

measure success.



SHUTTERSTOCK

Hopes are high that the UN climate conference will mark the moment when the world finally gets serious about putting the brakes on carbon pollution. Will it be enough?

THIS DECEMBER, 195 NATIONS WILL MEET IN PARIS TO HAMMER OUT A NEW global climate agreement. “Everybody in the world working on climate change will be there,” says EDF vice president for international climate Nathaniel Keohane. “We must seize this opportunity.”

The urgency is palpable. Heat waves, wildfires and melting ice sheets are worrying scientists around the world. From farmers in drought-stricken California to flood victims in Myanmar, people everywhere are feeling the effects of extreme weather.

The good news is that a new consensus on climate is emerging—one in which action is decentralized, driven by national governments, even by states and provincial capitals. The meetings in Paris will harness that energy so the world can act.

Getting there

The road to Paris has run through more than 20 cities hosting UN climate conferences since 1992—from Rio de Janeiro to New Delhi. In Kyoto in 1997, the world’s nations negotiated the first treaty to limit carbon emissions, but the U.S. Senate, in a lopsided vote, expressed disapproval of any treaty before the conference even began. Senators rejecting climate science made common cause with those who claimed that developing countries weren’t doing enough. Since then, the problem has worsened dramatically: global carbon emissions have risen from roughly 20 billion tons a year in the early 1990s to 35 billion tons today.

EXPERT TIP

“Out of the ashes of Copenhagen, important progress was made. The test for Paris is not a legally binding treaty, but a more practical question: How soon will countries’ commitments cause global greenhouse gas emissions to stop going up and start coming down?”

—EDF VP for international climate Nat Keohane

The last major climate conference, in Copenhagen, in 2009, ended in disappointment as rich and poor nations pointed fingers at each other about who is responsible for reducing emissions. Today, however, the old, unattainable goal of a treaty with binding targets has given way to a new dynamic.

Now, individual countries, and even states and cities, are moving ahead with their own plans, striking deals with one another. Last November, when the United States and China jointly announced ambitious climate commitments, it marked the beginning of a new era for these talks. Instead of hiding behind excuses for inaction, the two largest emitters launched a virtuous cycle, urging each other toward greater commitments on climate. Now, 63 countries, accounting for more than 70% of emissions, have announced emission reduction goals through 2030.

EDF is focused on building a coalition of jurisdictions that want to go faster and farther in developing common carbon markets. For example, we worked closely with California to link its carbon market to Quebec’s. And we are now working to bring in Ontario as well, as that province moves to launch emission trading. Even in the new paradigm of countries moving forward with their own tailored

SOME OF EDF’S GUIDES IN PARIS



Dr. Nathaniel Keohane

A former special assistant to President Obama for Energy and the Environment,

EDF economist Keohane is VP for international climate.



Dr. Stephan Schwartzman

For more than two decades, Schwartzman, an anthropologist and director

of EDF’s tropical forest policy, has played a key role promoting rainforest protection in international climate talks.



Alex Hanafi

Attorney Hanafi is a veteran strategist and expert on international business negotiations. He

coordinates EDF research on innovative policies to reduce greenhouse gases around the world.



Dana Miller

EDF forestry expert Miller is helping develop a market system that will credit nations when

they reduce carbon emissions by protecting rainforests.



Dr. Zhang Jianyu

Zhang is director of EDF’s Beijing office and leads our effort to solve China’s

environmental problems using market-based solutions. He helped found China’s first environmental consulting firm.

EDF will be there

We’re sending a team of economists, scientists and policy experts to circulate ideas and pressure delegates to make the strongest possible commitments.

HIGHLIGHTS

In Brazil, indigenous communities have become stewards of 20% of the Amazon, slowing deforestation by 70% and protecting biodiversity.



PHOTOS: SHUTTERSTOCK/ALPORA

Cleaning up cars and trucks, along with greenhouse gas pollution from power plants and oil and gas operations, is a crucial part of the U.S. strategy to curb climate change.



Island nations like the Maldives are on the front lines of climate change due to sea level rise. Their voices must be heard.



plans, the UN still plays a vital role, however. The UN process provides a platform for countries to make commitments. And of course making pledges is only the first step: The next order of business is ensuring that the pledges are met. The UN can help establish rigorous standards for monitoring, reporting and verifying emissions reductions.

Over the past several years, pressure has been building on countries to act, as the climate crisis worsens. The magnitude of

these events has helped EDF and other organizations press governments to make serious commitments to reduce emissions. Adding to the political will is the commitment of businesses, especially in Europe. In May,

the heads of several oil companies, including Shell and BP, signaled that they're ready for a price on carbon.

Some of the most striking progress involves rainforest nations, especially Brazil. About 15% of global greenhouse gas emissions come from tropical deforestation (more than from all the world's cars, trucks and buses combined). In many nations, however, rainforests are still being cleared at alarming rates.

In Warsaw in 2013, a strong agreement was forged on Reducing

Emissions from Deforestation and forest Degradation (REDD), offering economic incentives for forest conservation. Now all that remains is to approve the final text in Paris. Scientific advances are helping curb deforestation. Dramatically improved satellite technology now allows observers to track deforestation in real time, ensuring that landowners meet their commitments. Some tribes are also using GPS technology to track illegal logging.

An ambitious agenda

Another global atmospheric problem—depletion of the ozone layer by chlorofluorocarbons (CFCs)—was addressed relatively quickly in the late 1980s. But that was a simpler task, since CFCs had limited uses in aerosols and refrigeration. Climate change is a different story, with greenhouse gas emissions woven into nearly every aspect of modern life. Drastically reducing them will take a fundamental restructuring of the energy economy.

In the run-up to Paris, each country has been asked to submit pledges to lower its emissions. In October 2014, Europe tightened its emissions reduction target to 40% below 1990 levels by 2030. Then, the following month saw the historic U.S.-China announcement to lower emissions. The United States committed to cutting its emissions, by 2025, to at least 26% below 2005 levels. China agreed to slow and stop the growth of its emissions by 2030. It was the first time China had made such an agreement with another nation, and it lit a fire under the climate talks. This September, China went further. It announced the launch of a nationwide carbon trading program in 2017. The program will be based on the seven pilot trading projects in China that EDF helped develop.

Together, the European Union, China and the United States account for nearly half of global emissions. By committing to reductions, they're putting pressure on smaller countries to pledge their own cuts. This can be done without sacrificing economic growth. Sweden, for example, has reduced its emissions by 23% since 1990, while growing its economy by more than 60%. In March, Mexico became the first big emerging economy to set an ambitious reduction goal of 25%. Brazil has proposed emissions reductions of 37% by 2025, but on forest policy, President Rousseff is unwilling to commit to more than stopping illegal deforestation by 2030. Governments have agreed on a goal of limiting the rise in global average temperature to 2° Celsius (3.6° Fahrenheit), the threshold beyond which many warn of serious climate effects. The fact is, we're already seeing serious effects from carbon pollution. Nonetheless, the world's nations see the 2° figure as an important target. The pledges countries have made so far won't get us there, but a strong agreement in Paris, along with ambitious future reductions, just might.

Americans welcome again

As the world's largest economy, responsible for nearly 15% of global emissions, the United States is critical to any agreement.

Today, while Congress shirks its responsibility on climate change, profound changes are under way in America's cities and states. California's Global Warming Solutions Act, a landmark law cosponsored by EDF, is cutting emissions even as the state's economy flourishes. The law aims to cut California's greenhouse gas emissions to 1990 levels by 2020. With Quebec having already linked with California, the state is now the nucleus of a new North American market and a catalyst for linking international carbon markets. States in the Northeast have

EXPERT TIP

"One thing we've learned: No single UN agreement will solve climate change. The problem is just too big and complex."

— Annie Petsonk, EDF international counsel

also taken action. The Regional Greenhouse Gas Initiative (RGGI), a cap-and-trade collaboration among nine New England and Mid-Atlantic states, has decreased carbon emissions by 25% while cutting electricity prices across the region.

Before this year, the United States had a credibility gap. Having taken no national action to cut emissions, America was in no position to demand cuts from other nations. Today, that's no longer the case, mainly because of EPA's groundbreaking Clean Power Plan (*see story p. 6*), which places the first-ever national limits on carbon pollution from existing power plants. Taken together with other initiatives—fuel efficiency standards for vehicles, new rules on methane and regional carbon markets—the Clean Power Plan strengthens U.S. leverage in Paris.

Insider tips

One trend will make cutting carbon emissions easier for everyone: dramatic advances in clean technology. The price of solar panels has plummeted by 80% since 2008. Wind energy prices have fallen by two-thirds since 2009. Denmark now gets 40% of its electricity from wind power while Germany in 2014 generated 31% of its energy from renewable sources. As noted by Bernstein Research, "Renewable energy is a technology. In the technology sector, costs always go down." And progress is being made: last year the economy grew, but global emissions did not.

Another trend helping the United States meet its targets is cheap natural gas. Natural gas, which emits much less CO₂ than coal, has been steadily replacing coal in U.S. power plants. But it's important to limit any leakage of natural gas, which is mostly methane. Unburned, methane is a powerful greenhouse gas.

KEY PLAYERS AT THE TABLE



1 United States, the world's 2nd largest emitter, has made commitments to reduce power plant and other emissions.

2 Brazil cut deforestation nearly 70% since 2005, but deforestation rates have risen recently. The government has pledged a 37% emissions cut by 2025.

3 Despite some early stumbles, the **EU** carbon market has met its targets; countries like Denmark and Germany are investing heavily in renewables.

4 India, the world's 3rd largest emitter, has resisted pressure to cut emissions, fearing that cuts would slow economic growth.

5 Russia, the world's 4th largest emitter, remains heavily committed to fossil fuels.

6 China now has nearly twice the emissions of the U.S. For the first time, it has publicly committed to peak its emissions.

7 Australia, with among the world's highest per capita emissions, has made only meager commitments compared to other developed nations.

8 Fiji and other island nations will bear the brunt of extreme weather and sea level rise.



ON A BUDGET

Some of the most important climate fixes are also the cheapest. Methane is a potent greenhouse gas, responsible for about one-quarter of the warming we're seeing today. Nearly \$2 billion worth of natural gas escapes in the U.S. every year, enough to meet the annual needs of more than five million households. Plugging 40% of those leaks would cost an estimated one penny out of the current price of about \$2.75 per thousand cubic feet of gas.

What success looks like

With the right policies in place, the International Energy Agency predicts, global energy-related emissions could peak by 2020. Paris alone won't get us there, but here are some steps we can take in Paris to get us closer to the goal:

- Robust commitments on emission reductions, especially from the large emitters like the United States, the European Union, China, Brazil and India.
- An agreement on measuring and reporting emissions. "When countries see that other countries are keeping their commitments, it will build confidence and trust," says Alex Hanafi, an attorney with EDF's delegation. "As in arms control, the watchword is—as President Reagan said—'trust but verify.'"
- An agreement to periodically strengthen pledges to reduce emissions. As technology advances, EDF and others are urging that emissions reduction plans be kept as stringent as possible. This will send a signal to the private sector that governments are prioritizing low-carbon development.
- Commitments to the UN Green Climate Fund, a mechanism for helping vulnerable nations make the transition to low-carbon economies and manage the impacts of climate change. Wealthy countries have pledged to mobilize \$100 billion a year, but so far only \$10 billion of government support has been raised. More needs to be done.

So the test for Paris is not a legally binding treaty. The ultimate measure of success is whether a framework is put in place to bend downward the long upward trajectory of global emissions. And whether we can do the job in time.

"Beyond Paris, we will need even deeper commitments to stabilize the world's climate," says Keohane. "But we're hopeful. We could soon witness the point in time when we turn the corner on climate change—when global emissions peak and begin to decline forever."

>>> STAY INFORMED >>>

As the action unfolds in Paris, EDF's delegation will be providing regular updates and a look behind the headlines for our members. Stay tuned November 30 through December 11, 2015.

 edf.org

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Wanted: A chemical safety law that we can trust



GETTY

How an EDF experiment helped wake up Congress to a toxic threat.

EDF CHEMICAL CAMPAIGN director Jack Pratt had an idea. To show that no American—not even a member of Congress—is safe from toxic chemicals, Pratt, a DC resident, grabbed a few sheets of tin foil and scissors and headed for the U.S. Capitol. There, he unzipped the cushions of six congressional couches, snipped off small pieces of foam, wrapped them in foil and sent them to Duke University for chemical analysis.

And guess what? Three of the samples tested positive for a toxic flame retardant, Tris (1, 3-dichloro-2-propyl) phosphate (TDCPP). This chemical, used in

household and office furniture and carpet padding, has been linked to cancer and impairments in brain development. The story got the attention of its target audience, the U.S. Congress.

Pratt's unorthodox experiment demonstrated an urgent need for reform. America's profligate use of chemicals is out of control. Under current U.S. law, no one—not even a high government official—can ensure that widely used chemicals are safe. And it's nearly impossible to restrict chemicals, even those known to be dangerous.

For over a decade, EDF has worked to strengthen America's outdated and inadequate chemical safety law, the 1976 Toxic Substances Control Act (TSCA). This year our work paid off with encouraging progress toward a much improved law with bipartisan support. In June the House passed new TSCA reform legislation. The Senate's bill—for which EDF provided expert assistance—has collected 52 cosponsors. Congress is set to take it up soon.

Chemicals and you

In the meantime, EDF has kept up the pressure with an unusual pilot project to raise awareness and spur more research about the extent of chemicals in daily life. For one week, 28 citizens wore special wristbands designed to identify the chemicals in their personal environment. Developed by MyExposome with

technology from Oregon State University, the silicone wristbands look much like the ones used to support various causes but can detect over 1,400 chemicals.

EDF president Fred Krupp was one of the volunteers. Krupp's wristband detected four chemicals that are persistent, bioaccumulative and toxic. It also turned up a phthalate banned in children's toys but still widely used elsewhere, a flame retardant and an antimicrobial chemical used in soaps and hand sanitizers that can disrupt the body's hormone system. Twenty-four of the 28 wristbands in the group also detected at least one flame retardant, and 93% at least one kind of pesticide.

While this project did not use the wristbands to determine levels of exposure, it did show the pervasiveness of hazardous chemicals in our daily lives.

EDF is laying the groundwork for larger projects that will use the wristband technology to collect data from a broader range of the population to better understand what chemicals we come into contact with every day.

"It's clear that even the most careful shoppers can't totally avoid exposures to hazardous chemicals," says Dr. Sarah Vogel, vice president of EDF's health program. "We need a national solution to this problem that starts with a strong, new law that ensures the safety of chemicals in everyday products."



MYEXPOSOME, INC.

Determining our daily chemical exposure could be as easy as wearing a bracelet.

Common ground in Cuban waters

As the United States and Cuba normalize relations, and tourism booms, EDF helps Havana craft a national plan to protect imperiled sharks.

A TEAM OF U.S. AND CUBAN scientists this spring attached a satellite tag to a longfin mako shark 20 miles off Cojimar, a small fishing village that was an inspiration for Ernest Hemingway's *The Old Man and the Sea*. It was only the second time a longfin mako had ever been tagged. In July, the tag popped to the surface in the North Atlantic, east of the Chesapeake Bay, and began transmitting data.

During the spring expedition, part of the Discovery Channel's "Shark Week" series, scientists from Cuba's Center for Coastal Ecosystems Research and Center for Marine Research, Florida's Mote Marine Laboratory and EDF worked side by side to explore the mysteries of shark behavior, habitats and migration.

The scientific exchange comes as the United States and Cuba normalize relations after more than five decades of animosity. With Cuba slowly opening the door to private enterprise, safeguards are critically needed.

"The thaw will mean new tourists



Cut off by the U.S. embargo, Cuba has been spared rampant development.

and new development, and that will put greater pressure on coastal areas," says EDF partner Dr. Jorge Angulo, director of conservation at the University of Havana's Center for Marine Research.

Operating under a special license from the U.S. government, EDF has been working with Cuban scientists for 15 years on issues ranging from coral reef conservation to sustainable coastal development. EDF helped lay the foundation for a network of marine protected areas and is now working to strengthen protections for the Gardens of the Queen, a marine park that teems with sharks and other giant fish rarely found elsewhere in the Caribbean.

Such joint scientific work is critical for the two countries, whose ecosystems are interconnected. Sharks are particularly vulnerable. "Populations of some large sharks have fallen by as much as 90% in the Gulf of Mexico," says EDF scientist Dr. Jake Kritzer. As top predators, sharks play a crucial role in the health of marine ecosystems, keeping them in balance.

The Cuban government asked EDF to help develop its national plan of action for sharks. The plan, to be finalized in December, includes protection for juvenile sharks, improved monitoring of threatened species and special

conservation areas where fishing for sharks is prohibited. Our research already has identified possible nursery grounds for globally threatened oceanic whitetip sharks off Cuba's northwest coast.

EDF and our partners are now conducting comprehensive surveys of sharks caught by fishermen. "You can't manage fishing if you don't know how many fish are in the water," says Valerie Miller, who manages EDF's shark projects.

To curb overfishing, the Cuban government is also engaged in an initiative with EDF called SOS Pesca aimed at combining fishing rights with catch limits and protected areas. In contrast to top-down management of the past, the project is equipping local leaders with the tools to manage their own fisheries.

The threats facing sharks in the Gulf are emblematic of the dangers they face worldwide: heavy fishing pressure, insufficient data and a lack of coordination among countries to conserve highly migratory species.

A half-century of isolation and limited development has meant that Cuba's coral waters have largely escaped the devastation seen elsewhere in the region. This could soon change. That's why enacting conservation policies is so important.

"Sharks have been around for 420 million years," says Dan Whittle, director of EDF's Cuba program. "We don't want them to disappear on our watch." If successful, the program can be a model for managing other imperiled migratory species such as tuna and swordfish.



Cuba has 20% of the world's known shark species, including this rare oceanic whitetip. Our collaboration will help create solutions that reduce the killing of sharks.

DOUG PERKINS / NATURE PICTURE LIBRARY

JOSE A. REY

Why cleaning up agriculture matters—and



PHOTOS: NOAA; GETTY; PETER ESKICKANT; GEO/AUROPA; DONE MATSILAMNY



IMPACTS OF FERTILIZER POLLUTION (1) Excess fertilizer washes into the Mississippi River basin, which drains 31 states, causing a 5,000-square-mile “dead zone” in the Gulf of Mexico every summer. (2) Destructive floods—worsened by climate change and removal of wetlands and riverside buffers—are becoming more common in Missouri and other states. (3) Toxic algae bloom in Lake Erie in 2014 contaminated the drinking water for 500,000 people in Ohio. (4) Expanding farms in the Corn Belt have encroached on sensitive areas, destroying habitat and threatening birds like the endangered whooping crane.

Throughout history, when we’ve needed to produce additional food for a growing population, we’ve gone to nature’s vast storehouse and made withdrawals, such as filling wetlands and using fertilizer inefficiently. Now we’ve overdrawn nature’s account.

Fertilizer pollution, says EPA, is one of the costliest and most challenging environmental problems of the 21st century. One consequence: a huge “dead zone” in the Gulf of Mexico at the mouth of the Mississippi River. Another: nitrous oxide air pollution that worsens global warming.

By using fertilizer efficiently and creating wetlands in strategic places to absorb runoff, farmers can improve water quality, shrink the dead zone and reduce global warming while growing plentiful crops.

How farmers can become frontline stewards:

■ MANAGE FERTILIZER BETTER

EDF promotes techniques for applying fertilizer precisely—at the right time in the growing season and in the right amount—to prevent excess runoff and improve water quality. We’re focusing on corn, which accounts for about 40% of all U.S. fertilizer use and covers 90 million acres.

■ PLANT COVER CROPS

Dormant fields without vegetation are prone to erosion and degraded soil health. Planting crops such as grasses and grains after the main crop is harvested helps bind nutrients in the soil, prevents erosion and keeps soil healthy.

■ MIMIC NATURAL WATER FLOW

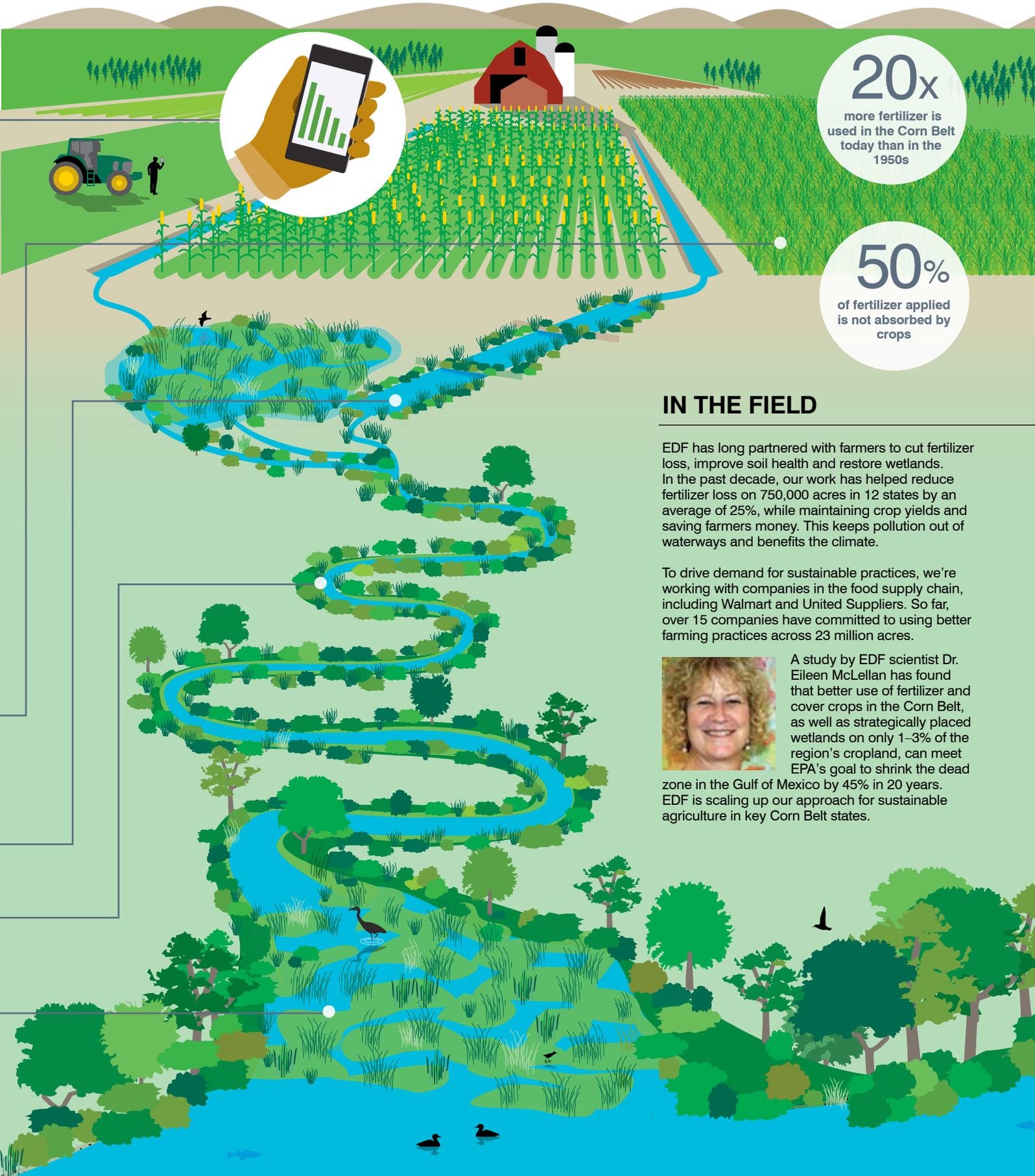
Ditches on farms, which drain water and runoff, typically have bare dirt banks. Planted with vegetation and filled with aquatic plants, they become highly effective at filtering pollutants and slowing floodwaters, helping protect downstream communities.

Many streams have been straightened and channelized to improve drainage, but that worsens flooding. Restoring streams with their natural curves and floodplain slows the flow of water and helps recharge groundwater.

■ REBUILD WETLANDS

Wetlands and prairie grasses act as sponges, storing and purifying water and slowly releasing it, slowing the momentum of floodwaters. They also provide critical habitat for wildlife and fish. A large proportion of the Corn Belt’s wetlands and native prairie grasses have been converted to croplands.

what EDF is doing to make it happen



20x
more fertilizer is
used in the Corn Belt
today than in the
1950s

50%
of fertilizer applied
is not absorbed by
crops

IN THE FIELD

EDF has long partnered with farmers to cut fertilizer loss, improve soil health and restore wetlands. In the past decade, our work has helped reduce fertilizer loss on 750,000 acres in 12 states by an average of 25%, while maintaining crop yields and saving farmers money. This keeps pollution out of waterways and benefits the climate.

To drive demand for sustainable practices, we're working with companies in the food supply chain, including Walmart and United Suppliers. So far, over 15 companies have committed to using better farming practices across 23 million acres.



A study by EDF scientist Dr. Eileen McLellan has found that better use of fertilizer and cover crops in the Corn Belt, as well as strategically placed wetlands on only 1–3% of the region's cropland, can meet EPA's goal to shrink the dead zone in the Gulf of Mexico by 45% in 20 years. EDF is scaling up our approach for sustainable agriculture in key Corn Belt states.

Justice comes to the Delta



PHOTO: JIMMY DREHARSTINE

The world's largest coastal restoration project is about to begin in Louisiana. The lessons we'll learn there can teach us how to protect vanishing coastlines everywhere.

I T WAS RIGHT AFTER A RAINSTORM last March that Estelle Robichaux saw the piping plovers and least terns on a strip of beach south of New Orleans. Her heart leapt with excitement. "That was no ordinary bird sighting," says Robichaux, an EDF restoration expert. She was touring a coastal barrier island that only five years ago had severely eroded when the BP Deepwater Horizon oil disaster hit. Now, thanks to BP penalty funds that allowed restoration of the island, new vegetation is sprouting and migratory birds are back.

Despite such progress, the toxic effects of the spill are still widespread, especially on the sea floor. Tar mats, reminders of the thick crude's impact, con-

tinue to wash ashore.

But these days there's more good news than bad. After years of litigation and unrelenting pressure from EDF, this summer BP offered to settle out of court and pay \$18.7 billion in penalties to mitigate the damage from the spill. If approved by the judge, it will mark the largest environmental settlement in American history. Our coalition helped ensure that 80% of penalty money will go to coastal restoration and economic recovery in Gulf states. To date, nearly 50,000 acres have been restored or conserved.

"This settlement will allow restoration to take off and the delta to thrive again," says Steve Cochran, director of EDF's Mississippi River Delta project.

For Louisiana, whose portion of the settlement totals \$6.8 billion, the agreement comes at a critical time. Since the 1930s, the delta has lost 1.2 million acres. For decades, shipping channels and levees have deprived the marshes of river sediment they need to survive. Today, more than an acre of land slips away every hour. The BP spill made things worse. A recent study found that oiled marshes erode at twice the rate of healthy ones.

EDF has long worked with state leaders and the Army Corps of Engineers to restore the delta—a rich ecosystem that provides habitat for tens of millions of migrating birds and drives a \$23 billion

fishing industry. Our scientists led studies showing that the most effective way to rebuild the delta and protect New Orleans from storms is to harness the river's natural forces and allow its silt to replenish bottom lands. Living proof is the Atchafalaya River Delta, which has been building new land for decades because of sediment-laden flows routed its way. EDF made sure this approach is integral to Louisiana's \$50 billion, 50-year blueprint for comprehensive restoration.

Making it possible for the Mississippi to build land again won't be easy. EDF has formed a team of scientists and engineers who will monitor the sediment diversions to ensure the greatest benefits to the environment and communities. We also launched a design competition to get the world's best minds to reimagine a thriving delta for people, wildlife and industry. Now, EDF is working with Louisiana and the Corps to include the innovative ideas in restoration plans. The winning designs all call for using the natural force of the river to create land.

"We now have the science and technology to replenish estuaries and marshes with sediment and build back thousands of acres of lost wetlands," says Natalie Peyronnin, EDF director of science policy for delta restoration. A healthier coastline is more resilient to storms made worse by climate change.

Over \$1 billion has already been invested. "Money can't ever replace the loss of life from the oil disaster," adds Cochran. "But the BP settlement can help heal the delta."



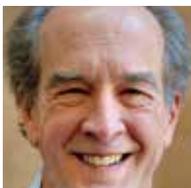
MICHAEL DENCKER

The result of BP's "gross negligence"



GETTY

Microgrids test power monopolies



Dick Munson oversees EDF's clean energy work in the midwest.

Microgrids that can disconnect from a centralized electric grid and operate independently are sizzling hot these days. Cities vulnerable to storms want them. Neighborhoods interested in renewable energy

and lower power bills want them. And now, traditional utilities want them to make their systems more reliable and to expand their business.

So when will microgrids dot American cities and towns? Answer: when new policies reduce historic barriers created by monopolies and open the door for decentralized and third-party energy arrangements. Not surprisingly, utilities will fight to protect their market share and we're now seeing the beginnings of a struggle that will likely take years to play out.

Commonwealth Edison, for example, is promoting legislation allowing the Illinois utility to invest \$300 million to build several microgrids. Yet ComEd wants to control the microgrids and own distributed generators such as solar arrays and cogeneration units that are part of them. As a result, the utility could expand its monopoly to these decentralized power plants.

It's not hard to understand why. Utilities want to have the cake (the new microgrids) while eating it, too. They have no desire to see a big piece of their business—distribution of energy—fall into the hands of someone else. But as Thomas Edison noted, "I can only invent under powerful incentive. No competition means no invention."

>>> FULL STORY >>> edf.org/microgrids

Rice farmers can earn carbon credits



Based in San Francisco, **Robert Parkhurst** leads EDF's greenhouse gas mitigation projects with working landowners.

The door is officially open for farmers to participate in carbon markets and earn new sources of revenue. The California Air Resources Board (CARB) recently approved a new protocol for rice growers, representing the first-ever carbon offset protocol for crop-based agriculture.

This means rice growers who implement conservation practices to reduce methane emissions can sell carbon credits to regulated California companies needing to reduce their emissions under California's cap-and-trade program. The rice protocol marks a new chapter for sustainable farming and shows the central role agriculture can play in solving the climate challenge. Already 21 rice farmers on more than 22,000 acres have expressed interest in developing projects. CARB can now also move forward in developing other agricultural offset protocols.

Here's how the protocol works: Rice growers in California's Sacramento Valley or the Mississippi River Delta can implement one or more of three management practices on their land—dry seeding, early drainage or alternate wetting and drying—to reduce the amount of methane generated by rice growing and cultivation. Rice farmers who implement these conservation practices during the growing season will also make their farms more resilient to severe weather such as droughts.

>>> FULL STORY >>> edf.org/riceprotocol

Wake up and feel the heat

EDF climate scientist Ilissa Ocko cites sobering evidence that more people will be exposed to climate change impacts than previously thought. edf.org/soberingfacts



A Pacific fishery rebounds

How fishermen helped canary rockfish, a species declared overfished in 2000, to recover dramatically 40 years ahead of schedule. edf.org/canaryrockfish



EDF Voices blog

Find out what our experts are talking about. Visit EDF Voices at edf.org/blog.

Plastic trash in the ocean: Forgotten but not gone

A RECENT ARTICLE IN *SCIENCE* estimates that more than eight million tons of plastic enter the world's oceans each year. That's equivalent to finding five grocery bags full of plastic on every foot of shoreline in 192 coastal nations.

What happens to all this plastic? On the chemical level, unfortunately, almost nothing. In the ocean, plastic disintegrates into smaller pieces but does not biodegrade. Huge amounts of it float into circular ocean currents known as gyres and finally gather into "garbage patches" in the oceans. But the vast majority becomes ubiquitous. It turns up in bottom sediment and even in Antarctic ice.

All this plastic is also a serious hazard to hundreds of marine species. Sea birds like the albatross die of starvation because their stomachs fill with plastic they mistake for food. Fish, marine mammals and sea turtles also ingest plastic or die entangled in runaway plastic nets, called "ghost nets," that often float for years.

Lately, scientists are asking whether humans who eat wild fish need to worry about exposure from plastics passed up the food chain. According to a 2011 UN Environment Programme report, "There is growing concern over the potential impact on human health of toxic substances released by plastic waste in the ocean."

■ Take action yourself

As an individual, what can you do? At the local level, plenty. Switch to reusable bags and refillable water bottles. If you buy take-out, say no to excess packaging and disposable forks, spoons and knives. Pressure manufacturers to make more products recyclable. And read the labels on plastic products you buy (#1 PETE and #2 HDPE plastic are most easily recycled).

■ Volunteer for ocean cleanup

Each year the Ocean Conservancy mobilizes the International Coastal Cleanup to remove trash from waterways and the ocean. In 2014, an impressive 516,000



Drifting plastic bags look a lot like jellyfish, a favorite food for endangered sea turtles. The turtles eat them and often die from intestinal blockage.

volunteers picked up more than 16 million pounds of trash in 91 countries.

■ Support activist organizations

Join the Surfrider Foundation's campaign to ban polystyrene foam food containers in coastal communities. Also support organizations such as 5 Gyres to ban the tiny plastic beads known as microbeads. Used in a variety of personal care and cleaning products, these "microscopic abrasives" go down drains and through treatment plants into lakes and oceans. For example, every day an estimated 471 million microbeads wash into San Francisco Bay (on labels they are listed as polyethylene or polypropylene).

■ Get political

Seven U.S. states have passed laws restricting or banning products containing the beads. And California is expected to

pass the strictest ban in the nation. California's law is opposed by companies like Procter & Gamble and Johnson & Johnson. But, bending to community pressure, they too now promise alternatives to microbeads.

So far scientists have been unable to develop "bioplastics" that break down in oceans. Research continues, however. Scientists at Harvard recently introduced a bioplastic isolated from shrimp cells and made from a form of chitin, the second most abundant organic material on Earth. Critics want the work to go faster.

The solution isn't just cleanup. We need to reduce the amount of plastic we use. "Plastic pollution is a perfect case of the tragedy of the commons," says Doug Woodring of Ocean Voyages Institutes. "We all did this. We all need to fix it."

By Jim Motavalli

Plastic patrol

- Surfrider Foundation; bit.ly/1LnWynv. Extensive list of municipal plastic bag bans: bit.ly/1iCEILQ
- 5 Gyres; 5gyres.org. Ban the Bead details actions you can take and offers ocean-safe alternatives for scrubbing.
- Plastic Free Ocean; plasticfreeocean.org
- Ocean Conservancy; oceanconservancy.org
- Plastic Oceans Foundation; plasticoceans.net. Summarizes the threat of plastics to human health. See bit.ly/1K2dmCr
- Ocean Voyages Institute's Project Kaisei; projectkaisei.org
- Oceana; act.oceana.org/sign/p-plastics
- The Blue Frontier Campaign. The book, *50 Ways to Save the Ocean* is at: bluefront.org/files/50ways.php

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

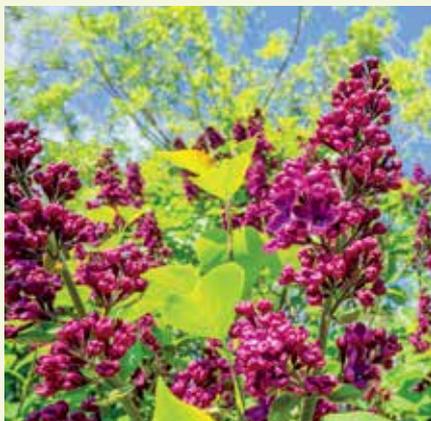
Letters

Weed warrior

I'm glad you did the feature on protecting local ecosystems from alien invaders (Spring *Solutions* 2015, p. 18).

I have worked with the Weed Warriors at Valley Forge Park and think all local parks should have Weed Warrior groups, especially in the spring when invasive plants can be easily discouraged. The groups also teach people to identify the bad guys. Please note, however, the butterfly bush is an invasive plant that crowds out native plants that sustain butterflies, birds and moths. People are confused by the name "butterfly" bush. NOT!!! Thankfully mine got killed by the lack of rain this spring.

—Peggy Hartzell, Nantmeal Village, PA



Beware the butterfly bush.

Bird saviors

Re: The story of how EDF's work to ban U.S. use of the insecticide DDT helped save the bald eagle, osprey and other birds of prey: Thank you to all the volunteers who spent long days in hack towers, feeding, observing and recording every detail of the young, reintroduced bald eagles.

—Mike Marr

We want to hear from you!
Email us at editor@edf.org.

Cheers for the Clean Power Plan

When I first heard about the Clean Power Plan I had an overwhelming feeling of relief. Relief that all my petition signings actually meant something and contributed to this success. We did it!

—Alan S., California

Your photos of 'everyday nature' are here!

We asked for photos of the natural world in your day-to-day life. More than 900 of you responded with fantastic shots. It was difficult, but we chose this photo of a cardinal at the feeder in the last snow of winter. To see more of your work, visit edf.org/photogallery.



Bobbie Alexander, Collegeville, PA

MEMBER SPOTLIGHT



COURTESY TANYA BROWN

Activist's reward: A visit to the White House.

For the love of a daughter

Tanya Brown's daughter, Sanaa, loves playing outside, but she is often stuck indoors. The ten-year-old suffers from asthma and environmental allergies that are aggravated by weather extremes. On hot summer days, she has difficulty breathing and her whole body breaks out in painful hives.

"As a mom, I try to be so careful about making the house safe for the kids," says Brown, a North Carolina native and mother of three. "But the moment Sanaa walks out the door, I have no control over what she is exposed to."

This summer, Brown joined Moms Clean Air Force, an EDF-backed community of more than 550,000 parents taking action against air pollution and climate change.

"I've finally started connecting the dots between the health of the environment and the health of my family," says Brown.

In August, she was invited on stage at the White House as President Obama officially unveiled the Clean Power Plan, which sets national limits on carbon pollution from power plants. EPA estimates that the plan will prevent 90,000 childhood asthma attacks.

"When I volunteered I never dreamed I'd end up at the White House," says Brown. "I hope my daughter's story can help put a face on what's at stake."

“...it seems clear to me also that climate change is a problem which can no longer be left to a future generation. When it comes to the care of our common home, we are living at a critical moment of history.”

—Pope Francis

