EDF
ENVIRONMENTAL DEFENSE FUND®

Finding the ways that work

BLUEPRINT 2020

EDF STRATEGIC PLAN 2015–2019

MISSION

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.

CONTENTS

Introduction	2
Climate	6
Oceans	20
Ecosystems	26
Health	32
New directions	36
EDF platform	38
Conclusion	40
Summary of program goals	42
References	44

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EDF STRATEGIC PLAN 2015–2019

BLUEPRINT 2020

No single entity can do all that is needed to address today's urgent environmental problems—not the United States, not China, not the global business community, certainly not Environmental Defense Fund.

But by working in partnership with many others, we can make a difference. So, for each area of our work—Climate, Oceans, Ecosystems and Health—EDF assessed what needs to be done to meet the world's most pressing challenges. Then we looked at how EDF is best positioned to help, based on the strengths we bring to the table and the good work others are doing.

The result is this strategic plan for the next five years. It is the most ambitious that EDF has ever developed, because today's complex challenges will require nothing less.

Five years is both too short and too long a time for such a plan. It's too short to bring about all the changes needed, so we have begun each part of the plan with a vision that looks well beyond 2020, to show where we're headed and keep us on track.

And in a fast-changing world, five years is too long to rely on a static plan. We will remain alert and flexible to respond to new scientific discoveries, technological innovations and social trends, and we will pursue important opportunities as they arise.

What will it take to succeed? For one thing, we'll need to continue to expand our efforts internationally, because challenges such as a warming climate and depleted oceans don't follow national boundaries.

Carl Ferenbach and Fred Krupp

And we must tap into the power of diversity, so that our programs and people reflect the countries where we work, including the changing face of America.

The results we achieve together hold the promise of improving human health and well-being. We can help reduce extreme weather, storm damage and drought; improve both food security and community prosperity; and guard against human exposure to air pollution, toxic chemicals and other environmental triggers of disease.

In these pages we share our vision, lay out milestones we will use to track our progress, and introduce a few of the people who will help make this blueprint a reality. Please join us in building a better future.

Carl Ferenbach
Chairman

Fred Krupp
President

INTRODUCTION

HOPE FOR THE FUTURE

AN INCREASINGLY GLOBAL SCOPE

"EDF got its start in the backyards of scientists on Long Island. Now we confront challenges around the world."

Diane Regas
Senior vice president for programs

Americans have much to be thankful for. For most of us, the air we breathe is the cleanest it's been in 30 years.[1] The acid rain that once fell on rivers, lakes and forests in the East—a result of air pollution—has decreased dramatically, and ecosystems are beginning to recover.[2]

Magnificent birds like the bald eagle, osprey and peregrine falcon, whose survival had been in question across the lower 48 states, now are thriving.[3] Red snapper and grouper in the Gulf of Mexico and more than a dozen species of Pacific groundfish are on the rebound, too.[4]

The bald eagle soared off the endangered species list in 2007, thanks largely to the U.S. ban on DDT that EDF helped win in 1972. That pesticide had thinned birds' eggshells, causing the number of chicks to plummet. It was this effect on the ospreys of Long Island, NY, that first attracted the attention of EDF's founders.[5]

This dramatic progress didn't just happen. It resulted from a powerful blend of scientific research, public activism and smart policy ideas that led to strong, effective environmental laws. Environmental Defense Fund is proud to have played a central role in achieving these goals over the past half century.

Today's urgent environmental problems demand a redoubling of our efforts, which is why we've developed the pathbreaking approaches in this strategic plan. The challenges are global in scope and involve a web of interconnections among EDF's four longtime areas of focus: Climate, Oceans, Ecosystems and Health.

continued on p. 4

HOPE FOR THE FUTURE *(continued from p. 2)*

TWO DECADES IN CHINA

“EDF has gained a strong reputation and breadth of experience in protecting China’s environment.”

Zhang Jianyu
China managing director

Climate change affects—and is affected by—other areas of our work. For example, healthy, well-managed ocean fisheries are better able to withstand the stress of climate change.[6] In turn, the climate will benefit from our Ecosystems work to reduce overuse of fertilizer. Less excess fertilizer means less nitrous oxide entering the atmosphere *(see p. 28)*.

In the next five years, EDF will concentrate on places and policies where we can make the biggest difference, building on what we’ve done. For example, we’ve worked in China for many years to bolster formerly lax environmental enforcement. Over that time, EDF has collaborated with Tsinghua University and others to train more than 25,000 environmental enforcement officials.

In 2011, China gave water pollution penalties teeth by removing financial caps, following an EDF pilot project in Chongqing. In 2014, after years of advocacy by EDF and our Chinese partners and others, daily cumulative penalties were added to China’s Environmental Protection Law. Reuters heralded the changes as “the most sweeping revisions to the law in 25 years.”[7] Now companies have powerful incentives to do the right thing.

These changes—along with seven pilot programs that EDF helped develop to address climate pollution—represent the kind of progress that gives us hope for the future.

China’s seven carbon trading pilot programs involve areas with a total population of 250 million people and could serve as a nationwide model.

SPOTLIGHT ON CORPORATE PARTNERSHIPS

Similarly, EDF's work to rebuild fisheries by helping design sustainable management policies has been extraordinarily effective. In the United States, fish populations are rebounding, fishermen are better off and far fewer fish are wasted after being caught in commercial fisheries.[8] EDF has supported similar progress in Mexico, Europe and elsewhere. Now a bold plan to convert fisheries representing nearly two-thirds of the world's catch could help sustainable fishing take hold globally *(see p. 23)*.

EDF seeks to build strong partnerships, including unexpected ones. Many elected officials and other decision makers had never seen our brand of inclusive environmental partnership until we walked through their doors alongside fishermen, ranchers, corporate leaders and other unlikely allies. It makes a powerful impression.

For example, EDF is working in partnership with Walmart and other major retailers to replace chemicals of concern with safer substitutes in tens of thousands of consumer products *(see p. 34)*.

And in California, Brazil and Mexico, we are working with scientific and business leaders, community partners and government officials to open California's carbon market to credits for rigorously verified reductions in emissions from deforestation. These credits will reward indigenous and forest-dwelling communities for protecting ecosystems. Over the next five years, we aim to help Brazil and the entire Amazon attain zero net carbon dioxide emissions from deforestation *(see p. 14)*.

On each of these issues, EDF's role involves applying the best science and economics—along with smart policies and politics—to harness the power of the marketplace to protect the environment. That's what we mean by "Finding the ways that work." It's the model you will see applied throughout this five-year plan as we scale up our resources, partnerships and global reach to help meet the most serious environmental challenges humanity has ever faced.

EDF's corporate partnerships, like the other cross-cutting strategies spotlighted in this strategic plan, advance our objectives and deliver results across all areas of our work.

For a quarter century, we have worked with industry leaders like FedEx, KKR, McDonald's and Walmart to spur innovation, shape public policy, influence supply chains and inform consumer choice.[9]

The business sector, a force to be reckoned with around the world, can be a vital partner in designing durable solutions and implementing them to protect the environment.

AN INDEPENDENT VOICE

"EDF accepts no funding from our corporate partners, freeing us to set aggressive goals and influence entire industries." [10]

Tom Murray
Vice president for corporate partnerships

OUR VISION OF THE FUTURE

CLIMATE

TAKING THE FIRST STEPS

"With realistic actions in a few key countries, the world's greenhouse gas emissions can start to go down by 2020."

Gwen Ruta
Vice president for programs

Imagine a future where clear skies replace choking smog in China's cities … where the Amazon's magnificent rainforests are worth more alive than dead … where homes not only run on clean electricity, but also generate, store and sell it … where companies thrive by focusing on sustainability ... and where the worst dangers of climate change are averted.

EDF has a long-term vision of a clean energy economy that extends far beyond 2020. But to get there, we must start taking the right steps today. This strategic plan lays out actions in a few key countries that can reverse the relentless rise of global greenhouse gas emissions within five years. Think how inspiring it will be for people to hear, in a time of continued economic growth, that climate pollution is going down—not up. Such an achievement surely will help engage more countries down the road, as we must.

EDF is optimistic about realizing this vision, because already the world is making real progress. In the past ten years in the United States, GDP grew by 14% while carbon dioxide emissions from energy fell 10%.[11] New passenger cars in China are set to hit a record 47 miles per gallon in 2020.[12] Solar panel prices declined by 80% in the past five years, while global installed solar capacity grew more than sixfold.[13] Low-carbon energy is the future, and the future is on its way.

EDF aims to use the power of the marketplace to speed the transition to cleaner energy. We're working to accelerate investments in energy efficiency, pushing regulators to change outdated rules and working with partners to modernize the century-old power grid so it can support the coming surge of renewable energy. Meanwhile, governments from California to China to the European Union are recognizing the value of putting a price on carbon dioxide pollution and acknowledging that there is no high-carbon path to shared global prosperity.

EDF has also identified low-cost steps to cut methane, a short-lived climate pollutant, giving us another key lever to counteract climate change. Doing this, while also cutting emissions of long-lived climate pollutants such as carbon dioxide, will lessen the risks from extreme weather and sea level rise for people and ecosystems alike.

CLIMATE INDEX

By 2020, turn the corner toward climate stability	8
Reduce long-lived climate pollutants	10
> China	10
> United States	12
> Europe	14
> Brazil and the Amazon	14
Limit near-term warming	16
Beyond 2020, drive further reductions	18

The world needs less pollution

How tomorrow's skies should look

Rainforests valued for their carbon

Clean energy communities

AT A GLANCE

EDF'S CLIMATE VISION

Avert catastrophic climate change by reducing emissions of climate pollutants, and help people and ecosystems build resilience and adapt to the warming that does occur.

2020 GOAL

Reduce emissions of climate pollutants enough that global emissions start coming down by 2020, and build the foundation for further reductions over the long term.

THEORY OF CHANGE

By focusing on the largest and best opportunities first, we can help reverse the rise of emissions soonest. To achieve deeper and lasting reductions beyond 2020, EDF will work in targeted countries and sectors to help design markets and policies that align national priorities with carbon reduction, turning the engines of prosperity toward a stable climate.

"EDF does constructive, thoughtful, hard work, and that gains respect—and results."

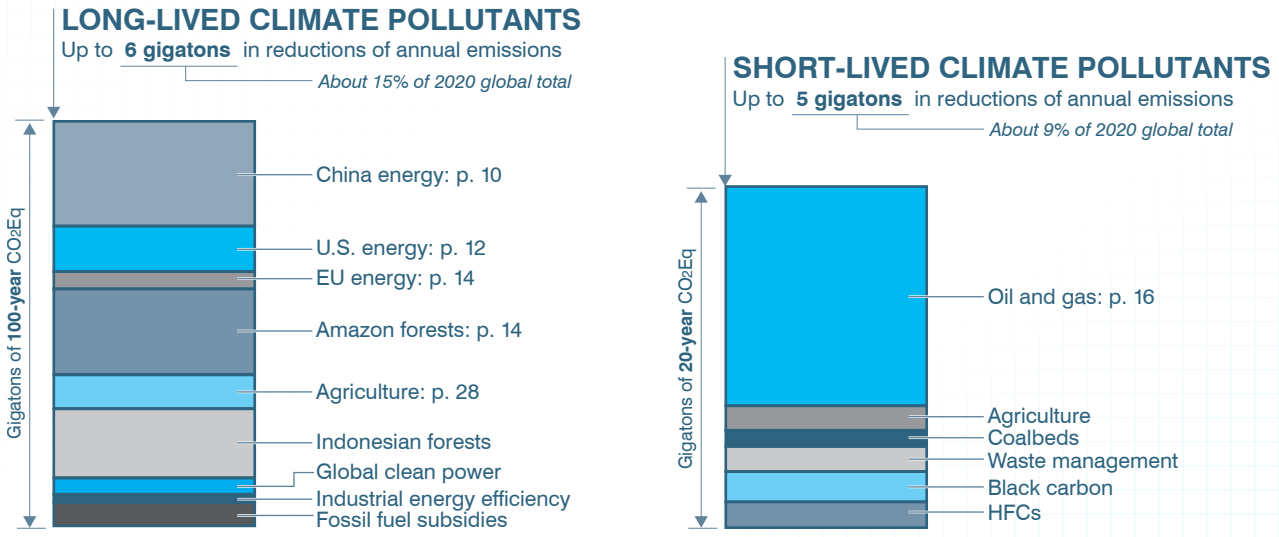
The Honorable George P. Shultz
Former U.S. Secretary of State

BY 2020, TURN THE CORNER TOWARD CLIMATE STABILITY

A 2014 news headline proclaimed, "Still Time to Avert Worst of Climate Change, but World Must Act."[14] In other words, climate change is a disaster with an escape hatch. To escape the worst climate change impacts, the world must quickly reduce emissions of carbon dioxide and other climate pollutants.

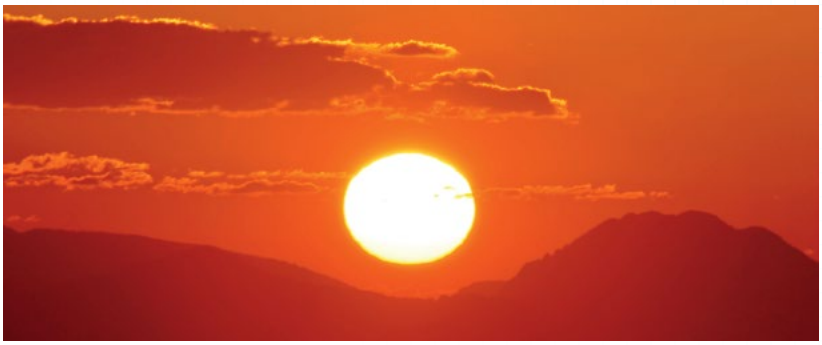
We can begin by reversing the persistent trend of rising emissions. EDF has assessed what it will take to change the trajectory—to turn the corner, so that emissions stop going up and start coming down. We have analyzed the science, the economics and the political possibilities.

The good news is that it's possible to turn the corner by 2020—as long as countries devote sufficient attention to the task. High-impact actions in just a few places, as summarized in the charts below, will get us moving in the right direction. These actions are designed to cut both long-lived and short-lived climate pollutants.[15]



Ambitious but achievable reductions in a few key countries and economic sectors will be enough to reverse the rise in global annual emissions of both long-lived and short-lived climate pollutants. EDF will take actions contributing to about half of these reductions, as described on the pages noted above.

The long-lived climate pollutants—including carbon dioxide from fossil fuel combustion and deforestation, and nitrous oxide from agriculture—warm the atmosphere for a century or more. If by 2020 we cut four to six gigatons of these emissions annually, below where we're now headed, it will be enough to bend the curve of emissions downward. Six gigatons is 6,000 million metric tons (MMT), roughly equivalent to current annual U.S. emissions of carbon dioxide, or about 15% of the 2020 global total.



Equally important is to cut emissions of short-lived climate pollutants by up to five gigatons per year, about 9% of the 2020 global total. These pollutants, such as the methane emitted from oil and gas operations, have a concentrated warming effect over a few decades or less.

Reducing emissions on this scale will require action in a number of key countries and the combined work of many groups. EDF will take steps that contribute to about half of the needed reductions. Of course 2020 is not the end game, so we must also start to set the stage for the greater reductions that will be needed in the future.[16]

Adaptation Even with ambitious reductions, some future warming is inevitable, in large part because of past emissions of climate pollutants that will remain in the atmosphere for generations.[17] Some of EDF's work on Oceans, Ecosystems and Health, described later in this plan, will help people and natural systems build resilience and adapt to the change that we cannot avoid.

REDUCE LONG-LIVED CLIMATE POLLUTANTS

To help reduce long-lived climate pollutants, EDF will concentrate on reducing carbon dioxide emissions from energy use in China, the United States and the European Union as well as from deforestation in the Amazon. We also will work to cut nitrous oxide emissions by reducing excess fertilizer use *(see p. 28, in the Ecosystems section)*.

ENERGY USE IN CHINA

Some very exciting things are happening in China right now. The nation's leaders increasingly recognize the twin dangers of air pollution and climate change and have begun to combat them by taking important steps toward cleaner energy. The commitment by top officials to use markets to address big environmental issues is also a huge advance.[19]

EDF VP Daniel Dudek (l.) serves on two of the highest official bodies advising Premier Li Keqiang (r.) on issues related to energy and the environment. Dudek has received the Friendship Award, China's top honor for foreign experts.

With more than 20 years' experience in China, EDF is positioned at the heart of these promising developments. We have set a bold 2020 goal of helping to cap the sources of at least half of China's carbon dioxide emissions.

Carbon caps China has declared its intention to build a carbon market step by step.[20] EDF's role in the launch of seven carbon trading pilot projects in China—and in helping develop monitoring and enforcement capacity—situates us well to contribute to the establishment of a national carbon market. EDF will help support effective implementation of carbon caps through policy tools ranging from enforcement to market oversight.

Some key efforts outside EDF[18]

Advance low-carbon urban design so that China's new cities have a reduced carbon footprint *(e.g., Energy Foundation China)*

Conduct citizen outreach on practical measures people can take to reduce greenhouse gas emissions *(e.g., WWF China)*

Mobilize prominent Chinese business leaders to make philanthropic investments to reduce desertification and sequester carbon *(e.g., Society of Entrepreneurs and Ecology)*

Throughout this plan, we take note of a cross section of ongoing efforts that complement EDF's work, giving one example of a group engaged in each area. It would be impossible to mention all the groups doing equally important work.

Carbon caps will affect even the biggest energy users—China's state-owned enterprises.

Energy efficiency The growth in energy demand must be slowed. Improving energy efficiency and promoting intentional design of cities and infrastructure are key steps in slowing this growth. EDF's Green Supply Chain initiative focuses on energy efficiency. The initiative aims to use the purchasing power of the government and multinational corporations to reduce emissions from millions of China's small and medium-sized enterprises, the engines of China's growth. EDF Climate Corps will also help these companies find the best opportunities to save energy and money. And we will work to develop effective financial strategies to mobilize capital for energy efficiency investments, by controlling credit risk.

Cleaner energy China needs to reduce emissions from the use of coal.[21] Renewables such as wind and solar power, as well as the responsible development of natural gas resources, can help China move toward this goal. In cooperation with China's premier energy research institutions, EDF will assess the barriers to the wider development and use of cleaner energy, and we will develop an action plan to mobilize resources to accelerate its use. We also will analyze China's natural gas industry and relevant environmental regulations and work with the Ministry of Environmental Protection to ensure that the environmental footprint of natural gas development and use is minimized and the environmental benefits maximized.

Objectives for 2020

This plan describes outcomes we aim to see achieved by 2020, not through the work of EDF alone but through many parties' combined and independent efforts.

_ Carbon dioxide emissions are capped at 2015 levels for a group of economic sectors and/or regions responsible for at least half of such emissions in China.

_ Energy efficiency is improved by 25%, compared with 2015 levels, as measured by an economy-wide energy intensity index.

_ 35% of China's primary energy mix comes from renewable energy, natural gas and nuclear, up from 15% in 2013.

Some of our partners: China Association for NGO Cooperation; China Council for International Cooperation for Environment and Development; China Electricity Council; Chinese Academy of Agricultural Sciences; Climate Department, National Development and Reform Commission; Policy Research Center for Environment and Economy, Ministry of Environmental Protection; Poverty Alleviation Office, State Council; School of Law, Peking University; School of Public Policy and Management, Tsinghua University; Shanghai Environmental Protection Bureau; Supervision Bureau, Ministry of Environmental Protection.[22]

SPOTLIGHT ON ECONOMICS

Since the 1970s, economics has been playing a central role in EDF solutions. In 1990, our economist Daniel Dudek helped to create the groundbreaking sulfur dioxide market that dramatically reduced acid rain at just a fraction of the expected cost.[23]

This success so impressed officials in China that Dudek was invited to advise the Chinese government on economic incentives for pollution control. EDF opened its office in Beijing shortly thereafter. Now our economists are helping to implement China's carbon market trials.

EDF's Economics Advisory Council brings together some of the world's best economic thinkers, as we continue to design market-based solutions ranging from catch shares for fisheries to habitat exchanges for wildlife.

GUIDING THE INVISIBLE HAND OF THE MARKET

"We must contribute the best that economics has to offer to shape decisions and actions in ways that protect our shared environment."

Frank Convery
Chief economist

THE IMPACT OF INNOVATION

"Technology is making clean energy competitive with coal for the first time in history, and that's a game changer."

Jim Marston
Vice president for U.S. climate and energy

ENERGY USE IN THE UNITED STATES

There is huge potential for clean energy in the United States, but to unleash it we must transform the century-old electricity system. EDF aims to help rewrite outdated regulations, spur competition in energy efficiency services and revamp the aging electric grid into an intelligent network that can manage vast amounts of renewable energy automatically. At the same time, we must reduce climate pollution from existing power plants.

To help accomplish all this, EDF has four interrelated efforts:

Power plant standards EPA's Clean Power Plan is designed to reduce carbon dioxide pollution from power plants nationwide.[25] EDF and a wide array of partners—including environmental, health and consumer organizations—will help strengthen the plan and defend it in Congress and the courts. Since EPA gives states a central role in implementing the plan, we will work with allies, policymakers, thought leaders and electric utilities in key states to overcome obstacles and seize opportunities.

Accelerating the deployment of clean energy State public utility commissions regulate electric utilities' operations and investments. In many states, outdated but entrenched regulations are obstructing the widespread adoption of clean energy alternatives. Rules dictating which companies can invest in solar energy or limiting incentives for consumers to reduce their energy use must be changed.[26] We will work to overhaul

Some key efforts outside EDF[24]

Ensure access to safe, reliable and affordable energy for all communities *(e.g., The Greenlining Institute)*

Promote the connection between national security and clean energy *(e.g., Operation Free)*

Engage disadvantaged youth in national service for the environment *(e.g., Green City Force)*

Mobilize grassroots activists to retire old coal plants and oppose new ones *(e.g., Bloomberg Philanthropies' partnership with Sierra Club)*

University of Virginia MBA student Michelle de Arruda served as one of more than 500 EDF Climate Corps fellows who have recommended energy savings worth more than $1 billion at U.S. companies and institutions, equivalent to keeping a quarter of a million cars off the road. Climate Corps, which has helped EDF drive demand for clean energy across the United States, expanded to China in 2014.[28]

these obsolete regulations to give consumers more choice and control over energy costs, while reducing pollution.[27]

Natural gas EDF is taking a holistic approach to natural gas, which emits less carbon dioxide than coal when burned and works well in tandem with intermittent renewable energy sources; gas turbines can be fired up to provide power when sun and wind fluctuate. While natural gas (without carbon capture and sequestration) is not a long-term climate solution, it does offer potential near-term advantages over other fossil fuels. To realize those advantages, however, we must reduce methane leakage from the natural gas supply chain *(see p. 16)* and protect local communities from the air and water pollution associated with oil and gas operations *(see p. 35)*.

Carbon markets State and regional markets are helping to reduce emissions of climate pollutants, demonstrating powerful approaches that could be adopted by more states. In California, the world's eighth-largest economy, EDF will help support expansion of the state's carbon market to include transportation fuels and will help ensure that at least 25% of the proceeds from the market will benefit disadvantaged communities.[29] In the Northeast, we will help augment the successes of the Regional Greenhouse Gas Initiative. That nine-state program currently has commitments to reduce emissions of climate pollutants from the electric utility sector by approximately 50% (below 2005 levels) by 2020.[30] We will be alert to opportunities for additional states, including Oregon and Washington, to engage in similar programs.

Objective for 2020

_ *Overarching objective:* U.S. carbon dioxide emissions from energy use are 20% below 2005 levels by 2020.

Supporting objectives include:

_ By 2016, new national standards are in place that reduce carbon dioxide pollution from fossil fuel power plants by 30% or more, relative to 2005 levels.

_ Lock in, by 2018, an 8% to 13% reduction in overall U.S. carbon dioxide emissions below 2005 levels, by promoting strategic energy management practices and reforming public utility policies.

_ Expand California's carbon market to cover 85% or more of emissions of climate pollutants; extend the carbon cap to 2030 or beyond; and leverage success in California and other states to build toward national climate action.

Some of our partners: CALSTART, Citizens Utility Board, Climate Action Campaign, Georgetown Climate Center, Institute for Policy Integrity, Interfaith Power & Light, Keeping PACE in Texas, Natural Resources Defense Council, Nicholas Institute for Environmental Policy Solutions, Ohio Environmental Council, The Nature Conservancy, Union of Concerned Scientists.[31]

SPOTLIGHT ON LAW

When vital environmental protections have their day in court, EDF's legal team frequently joins forces with state attorneys general, public health groups and other environmental allies to mount the strongest possible case.

That's what happened in the Supreme Court in 2006 when Massachusetts and other petitioners challenged EPA's refusal to limit carbon dioxide pollution. The successful outcome of that case and a series of later decisions led directly to the Clean Power Plan proposed by EPA in 2014.

THE FORCE OF LAW

"Well-designed and implemented legal systems are essential in securing lasting environmental protections."

Vickie Patton
General counsel

ENERGY USE IN EUROPE

Some key efforts outside EDF[32]

- Tighten the cap on emissions of carbon dioxide under the EU Emissions Trading System and expand its scope *(e.g., European Climate Foundation)*
- Promote demand-side measures to cut electricity demand and peaks *(e.g., E3G)*
- Train energy professionals on renewables and efficiency *(e.g., European Energy Centre)*

Europe, long admired as a leader in solar, wind and energy-efficient technologies, is running into regulatory barriers similar to those that keep the United States from fully capitalizing on energy efficiency and renewable energy: a tangle of outmoded regulations designed for an era of large centralized power plants.

From the challenges of integrating solar energy into Germany's electric grid to the untapped opportunities to invest in energy efficiency, these barriers can make greenhouse gas emission reduction targets look more expensive and harder to achieve. Countries phasing out nuclear energy risk reverting to coal in the face of these perceived obstacles.

Because North America and Europe are facing similar issues around reforming our energy sectors, we can work together to help unleash the potential of clean technologies, novel financing and new utility business models to reduce climate pollution. EDF will develop five-year objectives to measure our progress in this new area of cooperation.

FORESTS IN BRAZIL AND THE AMAZON

Some key efforts outside EDF[33]

- Reduce emissions from deforestation and burning of peat in Indonesia *(e.g., The Nature Conservancy)*
- Integrate remote sensing data to pinpoint deforestation as it occurs *(e.g., World Resources Institute)*
- Ensure transparency and accuracy of government monitoring of deforestation *(e.g., IMAZON)*
- Integrate the issues of food, health and sustainability *(e.g., EAT Forum)*

To stabilize the climate while meeting increasing demand for food and fiber, the world must protect and manage forests and agricultural lands to reduce their contribution to climate pollution and enhance their ability to keep carbon out of the atmosphere.

Tropical deforestation—mostly in the Amazon and Indonesia—causes about 15% of the world's carbon dioxide emissions and offers enormous potential for reductions in emissions by 2020.[34] We see an opportunity to build on EDF's quarter century of experience in Brazil and make that country the center of an expanded strategy to curb deforestation throughout the Amazon.[35]

Brazil has been a beacon of hope, reducing its Amazon deforestation rate by 70% in the last decade. Brazil did this, in part, by creating forest reserves and recognizing indigenous lands over an area the size of France. It also started to enforce its once lax forest protection laws. EDF has helped defend the rights of indigenous peoples who depend on these forests, by supporting legal recognition and effective protection of their territories.[36]

Relying on our deep relationships with local environmental advocates, indigenous peoples and government officials, we aim to help Brazil expand this success. As the country implements its Forest Code, it has an important opportunity to create a robust market in credits derived from forest reserves.

We also will explore expanding our efforts in Peru and Colombia, which are the Amazon countries containing the largest tracts of forest after Brazil.[37] Both of these countries have shown interest in market-based policies for environmental protection. Our overarching goal is to achieve zero net emissions of greenhouse gases from Amazon deforestation by 2020.

The opportunity to earn carbon market credits for verified reductions in deforestation emissions would help make forests in the Amazon and elsewhere worth more when left standing than when cleared for agriculture. EDF will press for carbon markets such as California's to recognize credits that are verified on a nationwide or statewide basis. (These are known as jurisdictional REDD credits, for Reducing Emissions from Deforestation and forest Degradation.)

To create additional market incentives for large-scale forest protection, we will collaborate with our partners to develop criteria for "Zero Deforestation Zones." Then we will work with leading consumer goods companies to preferentially source agricultural products such as soy and beef from these zones.

Objective for 2020

_ *Overarching objective:* Zero net carbon dioxide emissions from deforestation in Brazil and the entire Amazon by 2020.

Supporting objectives include:

_ By the end of 2015, Brazil agrees to a national target of zero net deforestation in 2020.

_ By 2017, California allows jurisdictional REDD credits to be used for compliance in its carbon market.

_ By 2017, 50% of the beef and 25% of the soybeans produced in Brazil are from jurisdictions on track to qualify as zero deforestation zones by 2020.

Some of our partners: Coordinating Body for the Indigenous Peoples of the Amazon Basin, Instituto Socioambiental, IPAM, The Nature Conservancy.[38]

LIMIT NEAR-TERM WARMING

The short-lived climate pollutants that have a warming effect, such as methane, black carbon and hydrofluorocarbons (HFCs), provide an additional route to address climate change. Reducing emissions of these pollutants—while we also reduce long-lived climate pollutants such as carbon dioxide—will slow the pace of warming and limit the warming we experience over the next several decades.[40] For example, out of all the warming over the next two decades that will result from climate pollutants being emitted today, methane alone is responsible for about one third.[41]

Climate is changing so fast that many communities and ecosystems are heavily stressed. Slowing the pace of warming can provide time to adapt. And only by sustaining the cuts of both short- and long-lived pollutants will we have a realistic chance of avoiding peak warming in excess of two degrees Celsius (3.6 degrees Fahrenheit) above pre-industrial levels.

Methane emissions from oil and natural gas operations are at the center of EDF's work on short-lived climate pollutants.[42] (Methane is the main component of natural gas.) The U.S. oil and gas industry could cut valve and compressor leaks and other methane emissions by 40% or more, by using existing, low-cost technologies.[43] EDF is working to reduce methane emissions across the entire U.S. natural gas supply chain. We will use the credibility we've built in the United States to work toward change in other countries, including Canada and Mexico.

Objectives for 2020

_ Methane emissions across the U.S. natural gas supply chain are reduced to 1% or less of total gas produced, which we believe will cut today's emission rate at least in half.

_ Methane leakage rates are quantified globally for the oil and gas sector, and companies or countries representing 40% of the global market are committed to measuring, reporting and reducing methane emissions.

Some of our partners: BlueGreen Alliance, Clean Air Task Force, Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants, Google Earth Outreach, Natural Resources Defense Council, The Nature Conservancy, Wyoming Outdoor Council.[44]

Some key efforts outside EDF[39]

Phase down HFCs in automobile air conditioning, retail refrigeration and other uses *(e.g., Natural Resources Defense Council)*

Educate the public and elected officials on methane emissions from livestock *(e.g., Chesapeake Bay Foundation)*

Reduce black carbon emissions by promoting cleaner burning cookstoves and fuels *(e.g., Global Alliance for Clean Cookstoves)*

SPOTLIGHT ON

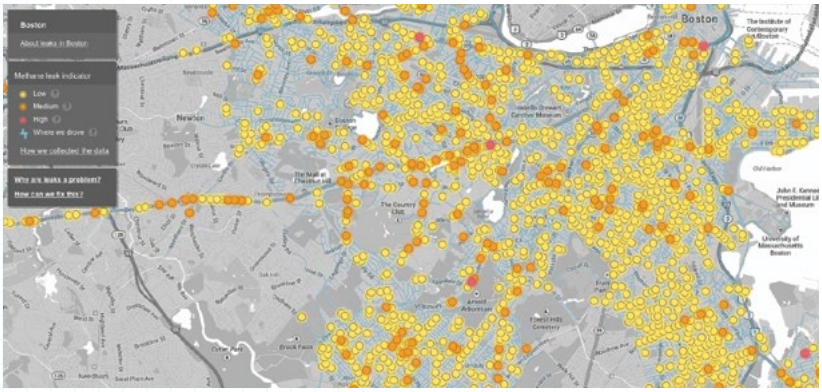
SCIENCE

EDF was founded by scientists and we continue to use the latest science to identify the most serious problems and most effective remedies. To maintain our edge, we use a combination of approaches: doing the science ourselves, partnering with academics, hiring senior contributing scientists and convening expert panels.

EDF scientists also scan the horizon for emerging issues that could demand our attention.[45] Our work on natural gas is a case in point. The problem of methane leakage from oil and gas infrastructure was not even on the radar in our last five-year plan in 2009, but soon afterward we took advantage of a new insight, did the science and married it to policy to get substantive results.

Chief scientist Steve Hamburg identified the problem for EDF's executive team in 2010, explaining the critical lack of data on methane emissions. Hamburg then coauthored a peer-reviewed paper on the issue with EDF scientist Ramón Alvarez, EDF trustee Steven Pacala of Princeton University and others.[46]

To close the data gap, EDF next organized a massive collaboration with 90 academic researchers and companies to conduct a series of 16 research projects measuring methane emissions along the natural gas supply chain.[47] Results already have been instrumental in informing state and federal action.



EDF and Google Earth Outreach teamed up to find and quantify natural gas leaks under streets and sidewalks using specially equipped Google Street View cars.[48]

A SCIENCE-CENTERED ORGANIZATION

"EDF scientists track, review, conduct and apply cutting-edge research and regularly collaborate with other leading institutions."

Steve Hamburg
Chief scientist

BEYOND 2020, DRIVE FURTHER REDUCTIONS

THE POWER OF THE MARKET

"When the world's major economies put an effective price on carbon emissions, we'll see everyone rushing to reduce carbon."

Nathaniel Keohane
Vice president for international climate

Some key efforts outside EDF[49]

Research CO_2 capture and storage *(e.g., MIT Carbon Capture and Sequestration Technologies Program)*

Coordinate nonprofits from around the world to engage on climate policy *(e.g., Climate Action Network)*

Conduct nonpartisan voter registration efforts *(e.g., League of Conservation Voters Education Fund)*

Highlight conservative voices on clean energy and climate *(e.g., Citizens for Responsible Energy Solutions)*

Quantify and publicize the economic risks from climate change *(e.g., Risky Business Project)*

Achieving a significant drop in emissions of climate pollutants by 2020 will be a huge victory for the environment. But it is only the first step toward the much larger reductions that will be needed.[50] To build the foundation for politically durable, economically sustainable additional reductions, it is essential to start now to create momentum toward a limit and price on greenhouse gas emissions in the world's major economies.

The past decade has shown us that no single law or single treaty will address the climate problem adequately: concerted actions are required around the globe. Priorities beyond 2020 include continuing to reduce emissions of the three largest emitters (China, the United States and the EU); laying groundwork for economy-wide reductions in emerging giants such as Brazil and India; and pursuing opportunities—such as reducing emissions from Canada, Mexico and international aviation—that offer prospects of near-term progress and could help build broader momentum through trade ties or by setting important precedents.

In the United States, we are helping to restart a productive national debate on climate solutions. With EDF's strong tradition of bipartisanship, we have a unique role to play in building public understanding of climate change and support for action, particularly among independents and conservatives. We seek to change the political dynamic by developing policies that resonate with people across the political spectrum and communications that reach climate-skeptical voters, increasing the likely rewards for leaders who deal with climate honestly.

As one way to help build political momentum for climate and health issues in the United States, EDF founded, and is helping to support, Moms Clean Air Force, a group of parents—now more than 300,000 strong—committed to taking action to protect the health and well-being of their families.[51]

To be effective around the world, we will concentrate our efforts where we can have the greatest impact, as detailed in our 2020 objectives on the following page. We also will develop a strategy to lay a foundation for capping and pricing carbon emissions in India, building on our existing work with partners to promote low-carbon development. And we will continue to engage in key multilateral forums to advance our objectives.

Objectives for 2020

_ *Overarching objective:* By 2020, one quarter of the world's carbon dioxide emissions are covered by durable, declining limits achieved with a carbon price, on track to having one half of emissions covered by 2030.

_ U.S. federal legislation is enacted that will reduce the country's emissions at least 33% below 2005 levels by 2025 and achieve continuous reductions thereafter.

_ Half of China's carbon dioxide emissions are capped at 2015 levels. *(See p. 10)*

_ A major economy with strategic ties to the United States, such as Mexico or Canada, adopts policies at the national level capping emissions from one or more major sectors.

_ Key nations implement a global market-based approach to reduce greenhouse gas emissions from international aviation (which the International Civil Aviation Organization will have adopted by 2016).

_ Emerging economic giants including Brazil have laid the foundation for national carbon markets by implementing monitoring, reporting and inventory provisions, instituting pilot programs and creating incentives for early emissions reductions from key sectors.

Some of our partners: Aviation Environment Federation (UK), International Emissions Trading Association, Getúlio Vargas Foundation, The Nature Conservancy.[52]

SPOTLIGHT ON POLITICS

The best environmental solutions come from having everyone pitch in, regardless of their political views. EDF Action, the political partner of Environmental Defense Fund, works to cultivate political allies and mobilize concerned citizens in a nonpartisan manner.[53]

In 2012, for example, EDF Action worked across party lines in the U.S. Congress to help pass landmark legislation to restore the Gulf Coast after the BP oil disaster. Breaking through partisan gridlock, the bill passed by a vote of 74–19 in the Senate and 373–52 in the House.

BRIDGING IDEOLOGICAL DIFFERENCES

"Changing the politics of climate won't happen overnight, but momentum is building and new allies are joining from across the political spectrum."

Elizabeth Thompson
President, EDF Action

OUR VISION OF THE FUTURE

OCEANS

OCEANS OF ABUNDANCE

“If we offer fishermen a financial stake in the recovery of fisheries, we can revive coastal communities and bring the oceans back to life.”

Amanda Leland
Vice president for oceans

Picture the world’s oceans once again abounding in fish, as part of a thriving and diverse marine ecosystem that supplies people with an increasing amount of protein-rich food.

This can be the future. Within our lifetimes, improved fishing policies and practices can help create much healthier oceans that support more fish, feed more people and improve livelihoods.

These outcomes go hand in hand, because a healthier, more resilient ocean is also one that can support larger harvests.

The oceans produce life and sustain it. They are home to everything from the gigantic blue whale to microscopic plankton. The oceans also provide meals and jobs for billions of people around the world. But as the human population grows, so, too, will the pressure on oceans.

Today, fisheries provide just a fraction of their potential in terms of food and income.[54] Although many threats, including climate change and habitat loss, contribute to the declining health of the oceans, overfishing remains the leading cause of fishery depletion worldwide.[55] Globally, 40% of fisheries are in deep trouble.[56]

The good news is that by tackling overfishing, we can unleash the oceans’ natural resilience and achieve a dramatic recovery in fish populations.

Today: Many fisheries are in trouble

Tomorrow: More fish in the water

More food on the plate

More prosperous fishing communities

AT A GLANCE

EDF'S OCEANS VISION

In our lifetimes, create thriving oceans that provide more fish in the water, more food on the plate and more prosperous fishing communities.

2020 GOAL

Be on track toward having 50% more fish in the sea by 2025.

THEORY OF CHANGE

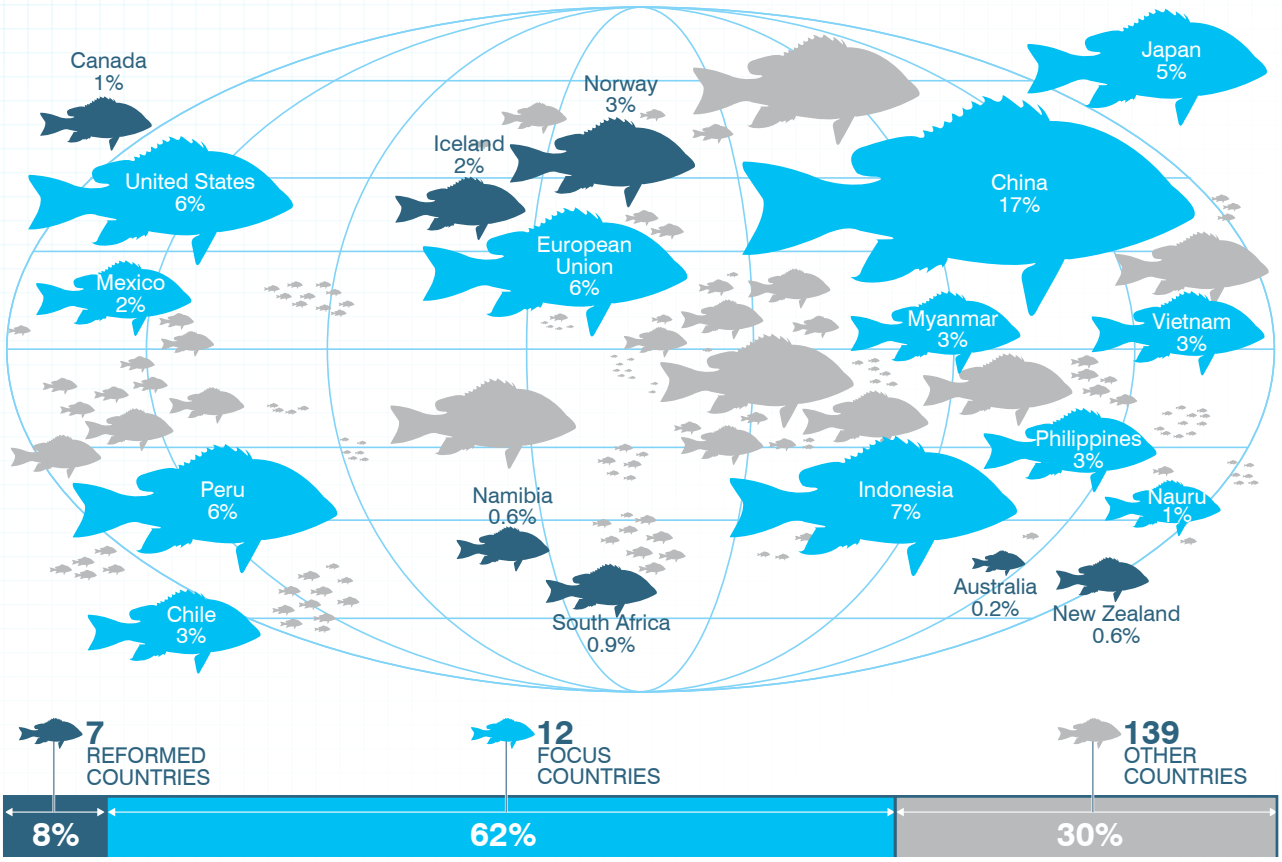
EDF aims to catalyze reforms so that sustainable fishing becomes the norm in 12 governments that account for 62% of the global catch. Reforms at this scale could tip the global fishing political economy so that sustainable fishing takes hold worldwide.

"EDF takes a pragmatic approach and works with fishermen and tries to involve them. That has enormous potential at the EU and national level."

John Goodlad
Chair, Fisheries Innovation Scotland

WORLD CATCH BY COUNTRY

PERCENT OF GLOBAL TOTAL IN 2012



Seven countries, shown in dark blue and representing 8% of global catch, already have transformed their policies and practices to sustainable fishing. EDF will focus on 12 additional governments, shown in light blue and representing 62% of the catch, to catalyze similar reforms. *(Note: Nauru refers to the Parties to the Nauru Agreement governing tuna fishing: Micronesia, Kiribati, the Marshall Islands, Nauru, Palau, Papua New Guinea, the Solomon Islands and Tuvalu.)*[57]

TURN THE TIDE OF OVERFISHING

New scientific research suggests the potential of the world's ocean fisheries to recover may be far greater than previously estimated.[58] EDF is working with leading scientists to understand what future benefits could be realized if sustainable fishing becomes the norm worldwide.

Our preliminary findings are profoundly encouraging: healthy global fisheries could provide as much as 75% more fish in the water, 50% higher seafood harvests and more than 100% greater value than today.[59]

Already there are signs that the tide is turning. Countries such as Canada, Norway and New Zealand have made the shift to sustainable fishing, and EDF successfully worked to get similar policies in place in the EU in 2013.[60]

In the United States, EDF has helped to spur significant advances in sustainability. Red snapper populations in the Gulf of Mexico are now three times the size they were in 2007, when we helped reform that fishery, and in 2014 the Marine Stewardship Council acknowledged the results of our work on the West Coast when it certified 13 species of Pacific groundfish as sustainable.[61] Currently more than two-thirds of the fish caught in U.S. federal waters are managed sustainably.[62]

Over the next five years, we will work to ensure that sustainable fishing is firmly established in the United States, and we will expand our current international work, which includes efforts in Mexico, Spain, Sweden and the United Kingdom.

EDF will help catalyze reforms in how fisheries are managed by 12 governments that together control 62% of the world's catch. Reforms at this scale could tip the entire global fishing economy so that sustainable fishing takes hold worldwide.

EMPOWERING PEOPLE

This ambitious goal is attainable because EDF will not work alone. We will work with a diverse set of partners, including fishery managers, scientists, investors, government officials and nonprofit organizations ranging from local groups to those with international scope. Often EDF will play a supporting role, where others are more established locally.

Our theory of change hinges on designing solutions that meet the needs of policymakers, the fishing industry, fishermen and others who will lead the way. By sharing knowledge, tools and experience with one another, we can help bring about the needed change.

CREATING INCENTIVES FOR CONSERVATION

We see EDF's role as helping to create the legal and economic conditions under which sustainable fishing can thrive. Much of our effort will center on working with governments to grant fishermen long-term, secure rights to fisheries under a clear set of rules. This resets fishermen's incentives, so that conservation pays.

EDF has been a leader in advancing this system of rights, responsibilities and rewards, which is known in the United States as catch shares. Because fishermen and fishing communities benefit financially as the fishery grows, they take ownership of recovery efforts.

Some key efforts outside EDF[63]

Establish marine protected areas *(e.g., Conservation International)*

Set standards to move aquaculture toward environmental sustainability and social responsibility *(e.g., Aquaculture Stewardship Council)*

Certify sustainable wild fisheries *(e.g., Marine Stewardship Council)*

Help consumers select sustainable seafood *(e.g., Monterey Bay Aquarium's Seafood Watch)*

FINANCING THE TRANSITION

As sustainable fishing takes hold, fishing communities will enjoy direct financial benefits. But sometimes there is a period of transition where it's necessary to help fisheries and communities over the hump.

EDF is working to secure new sources of capital and realign existing resources to support this transition. Private, public and philanthropic investors around the world are looking for investment opportunities and fishery projects are seeking capital to reform, but as of yet there are too few examples demonstrating the potential of sustainable fishing as an investable proposition.

A PATH FORWARD FOR SUSTAINABLE FISHING

Pre-2015	By 2020	By 2025	By 2030
Australia	Chile	China	Japan
Canada	European Union	Indonesia	Philippines
Iceland	Mexico	Myanmar	Vietnam
Namibia	Parties to the Nauru Agreement		
New Zealand	Peru		
Norway	United States		
South Africa			

Depending on the pace at which major fishing nations reform their policies (one possible scenario is shown above), sustainable fishing could grow from 8% of the world catch in 2015 to as high as 32% in 2020, 59% in 2025 and 70% in 2030.

Together with our partners, we aim to show how fisheries investment proposals can be structured to attract financing.[64] We will also work to establish new precedents for sustainable financing of fisheries to demonstrate the potential.

WORKING IN PHASES

EDF has developed a phased plan for the 12 focus governments. Many key partners with essential local expertise, such as Rare and WWF Spain, will help bring about reforms in these areas.

The pace of progress in the United States, Mexico and the EU has been very encouraging. In 2014, our team launched new efforts in Indonesia and the Philippines, where we recognize that significant successes may take more time. In addition, we believe opportunities with Chile, Peru and the Parties to the Nauru Agreement are ripe and should allow us to make additional significant progress by 2020.

Objectives for 2020

_ Governments representing nearly a third of the world's catch have adopted effective policies for sustainable fishing.

_ Twice as many fishermen around the world are fishing sustainably, compared with 2014, benefiting from higher revenues and rebounding fish populations.

_ The precedent is set that sustainable fisheries are a good investment, catalyzing a wave of new and realigned capital into the market to support reforms.

Some of our partners: Gulf of Mexico Reef Fish Shareholders' Alliance; International Sustainability Unit, The Prince of Wales's Charitable Foundation; Rare; Sustainable Fisheries Group, University of California, Santa Barbara; WWF Spain.[65]

AN ADAPTABLE APPROACH

"EDF's approach has the flexibility needed to adapt to varying cultural and legal circumstances."

Rafael Ortiz
Fisheries coordinator, EDF de México

OUR VISION OF THE FUTURE

ECOSYSTEMS

ALIGNING ECONOMIC INCENTIVES

"We'll get lasting results by giving landowners economic incentives to protect the environment."

David Festa
Vice president for ecosystems

Imagine a future where farmers feed a growing world, while polluting less … where wildlife thrives alongside the business activities of ranches and other working lands … where coastal ecosystems help shelter communities from ocean storms … and where both people and nature have the water they need.

To get to that future, we need to change business as usual. Take the way we produce food. Throughout history, when we've needed to expand food production, we've gone to nature's vast storehouse and made withdrawals: we've cleared forests, filled wetlands, dried up rivers and depleted the topsoil. We've overdrawn nature's account, and still we need to produce more. If current trends hold, we'll have nine billion mouths to feed by 2050—two billion more than today.[66]

If we're going to meet our growing needs for food and water, we'll have to do it in ways that not only stop harming the environment, but that actually start *helping* the ecosystems that serve us.

For more than a decade, EDF staff have been working with farmers and ranchers to start facilitating this transformation. As we've walked their land, we've seen some encouraging things.

Ranchers in Texas have shown that it can be profitable to raise cattle alongside endangered species like the golden-cheeked warbler. Farmers in the Midwest showed us that it's possible—and profitable—to reduce fertilizer pollution while maintaining or increasing yields. Vegetable growers in California showed us how they've optimized irrigation efficiency to reduce water use and increase profit margins.

If we can scale up these practices and make them the new business as usual, it will increase the resilience of the natural systems that sustain us.

Climate change and rising human population put added stress on soils, wetlands and waterways. EDF aims to increase the resilience of these systems so they can thrive even under stress. We are directing our work at fertilizer pollution, wildlife habitat, coastal protection and water use efficiency. Improvements in agricultural productivity will be crucial.

Today: Conflict over scarce water

Our vision of tomorrow

Home on the range

Fertilizer efficiency at our fingertips

AT A GLANCE

EDF'S ECOSYSTEMS VISION

The world meets human needs for food, water and coastal protection in ways that improve ecosystems, rather than harming them.

2020 GOAL

Incentives are in place to reward owners of working lands for generating environmental benefits while maintaining agricultural and forest productivity. In the areas where EDF is working, negative trends in fertilizer runoff, habitat loss, coastal erosion and water consumption will be reversed.

THEORY OF CHANGE

Creating economic benefits for practices that improve ecosystems will cause the adoption of those practices to increase.

"The only way to sustain basic human needs is to sustain healthy ecosystems. EDF's vision offers an inspiring path forward."

Jonathan Foley, Ph.D.
Executive director, California Academy of Sciences

MAKE FERTILIZER POLLUTION OBSOLETE

Today, much of the fertilizer used on farms goes to waste, costing farmers money, polluting water and affecting the climate by releasing nitrous oxide, a long-lived climate pollutant. EDF was among the pioneers in showing how farmers can reduce this pollution. The challenge has been to find ways to engage a large number of farmers to change their fertilizer practices.

Three recent developments could help tip the scales: the rising cost of fertilizer, California's cap-and-trade program (which rewards reductions in emissions of climate pollutants) and Walmart's commitment to reduce inefficient fertilizer use as one strategy toward cutting 20 million metric tons of climate pollutants from its supply chain.[68]

EDF will leverage these developments to drive changes in agriculture that could eliminate fertilizer pollution as a major concern. This would reduce not only climate pollutants but also drinking water pollution and dead zones like the 5,000-square-mile area at the mouth of the Mississippi.

Some key efforts outside EDF[67]

Use policy advocacy to eliminate corn ethanol subsidies *(e.g., Taxpayers for Common Sense)*

Reach out to consumers about more sustainable food choices including reducing meat consumption *(e.g., Sustainable Table)*

Engage in policy advocacy for farm subsidy reform *(e.g., Environmental Working Group)*

Objectives for 2020

_ Walmart, food companies and agribusinesses adopt policies that drive improved fertilizer practices on at least half of U.S. corn acreage.

_ North American carbon markets adopt protocols leading to improved efficiency on farms and ranches, reducing greenhouse gas emissions by an amount equivalent to keeping one million cars off the road.

Some of our partners: Field to Market, General Mills, United Suppliers, Walmart, WWF.[69]

INCREASE HABITAT ON WORKING LANDS

We may associate wildlife with picturesque national parks and wilderness areas, but such refuges represent only 5% of U.S. land area, nowhere near what's needed to sustain the country's rich biodiversity. Imagine if we could make room for wildlife on privately managed working lands, such as farms, ranches and forests, which represent two-thirds of America's vast land resources.

EDF is rolling out a powerful new approach, called habitat exchange, that does exactly that, by letting landowners earn money creating or protecting habitat on their land.[70] The key is that many kinds of habitat are compatible with ranching and other activities, so working lands don't need to be taken out of production.

After—and only after—the habitat is verified to support the species of interest, the landowner can sell habitat credits to offset the impact of nearby development. In EDF's model, developers must buy credits for more habitat than the amount they disturb, so wildlife comes out ahead.

EDF proved the concept in Texas, and now we're scaling it up broadly. Habitat exchanges ultimately could attract a majority of the funds that developers now spend, often ineffectively, on attempts to mitigate their impact. With habitat exchanges, wildlife gets the certainty of added habitat, developers cut costs and red tape, and landowners get a new source of income.

Objectives for 2020

_ All habitat exchanges are meeting or exceeding goals for rebuilding target species.

_ Five of eight Fish and Wildlife Service regions, covering 90% of federally listed candidate species, adopt habitat exchanges or their equivalent.

_ $100 million annually in mitigation funding under the Endangered Species Act is invested in projects using habitat exchanges or equivalents.

Some of our partners: American Rivers, Colorado Cattlemen's Association, National Mitigation Banking Association, University of Wyoming.[71]

The golden-cheeked warbler has benefited from a habitat exchange in Texas.[72]

Some key efforts outside EDF[73]

Use legal strategy and policy to ensure effective implementation of the Endangered Species Act *(e.g., Defenders of Wildlife)*

Engage people to participate in citizen science to collect important wildlife data (*e.g., National Audubon Society*)

Encourage families to create backyard wildlife habitat (*e.g., National Wildlife Federation*)

PROTECT COASTAL COMMUNITIES

Some key efforts outside EDF[74]

Evaluate the potential of innovations in coastal science and engineering *(e.g., The Water Institute of the Gulf)*

Directly engage business leaders to advocate effective coastal restoration *(e.g., Greater New Orleans, Inc.)*

Expedite the implementation of aggressive, large-scale restoration projects to protect this irreplaceable region *(e.g., Restore or Retreat)*

Decades of mismanagement of the Mississippi River system and its Delta have caused the loss of half of Louisiana's threatened coastal wetlands, putting vulnerable communities at risk and destroying wildlife habitat, hurricane buffering capacity and the natural systems that support much of America's energy, shipping and seafood industries.

EDF and its partners are taking action to restore and protect this coast. The centerpiece is the Louisiana State Master Plan, which calls for the state to adapt to climate change by revitalizing and rebuilding natural infrastructure that protects the coast—delta wetlands, barrier islands and oyster reefs. This will benefit people in New Orleans and other Louisiana coastal communities.[75]

As the bipartisan RESTORE Act is implemented, directing 80% of BP Deepwater Horizon fines to Gulf Coast restoration, the challenge now is to translate the plan and promised funding into effective projects.

As we help implement the master plan, we will share successes and challenges with the global community. Between tens and hundreds of billions of dollars will be spent on coastal storm response and risk reduction in the coming decade—in Louisiana, along the East Coast and in coastal cities worldwide. EDF will share a rigorous assessment of the costs and benefits of investing in natural infrastructure, ensuring that these investments are evaluated on the same terms as investments in built infrastructure, such as levees and seawalls.

Objectives for 2020

_ $3 billion is being invested effectively on an annual basis in the design or construction of natural infrastructure to reduce coastal risks.

_ Effective design standards for natural coastal infrastructure are adopted by the major agencies that finance or approve infrastructure and by professional organizations.

Some of our partners: Coalition to Restore Coastal Louisiana, Lake Pontchartrain Basin Foundation, Lower 9th Ward Center for Sustainable Engagement and Development, National Audubon Society, National Wildlife Federation.[76]

REVITALIZE WORKING RIVERS

Specially designated wild and scenic rivers, whose natural flow is protected by federal law, are not the only waterways that support important fish and wildlife habitat. Magnificent working rivers like the Colorado also provide habitat—as well as recreational and cultural opportunities—while they do the job of supplying water for cities and agriculture.

Unfortunately, water in the West has been overallocated; there are too many people with legal claims on a limited amount of water. This creates scarcity and conflict, and the environment has the smallest of all claims, so it stands to be hurt the most.

To end a growing cycle of painful and drawn-out water wars, EDF has set out to work with the people who have the most to offer: farmers, who now receive 70% or more of the water withdrawals from rivers and aquifers. Investments and policy changes could inspire farmers to think differently about irrigation efficiency, water-sharing agreements and crop decisions—all of which could help rebalance the water equation.[77]

We are looking to cities in need of water to underwrite investments in more efficient irrigation in exchange for some of the water saved. If efficiency can give farmers more crop per drop, they can feed a growing world while still freeing up water for people and nature—and ending up better off economically.

The severe drought in California and the Colorado River Basin is affecting the politics around water in the West. EDF is reassessing the opportunities in this context and will develop new five-year objectives to measure progress.

The watershed of the Colorado River covers parts of seven Western states.

OUR VISION OF THE FUTURE

HEALTH

REDUCING UNHEALTHY EXPOSURES

“We owe it to our children and future generations to ensure the safety of chemicals and to cut air pollution significantly.”

Sarah Vogel
Health program director

More people will enjoy good health and long life when we reduce human exposure to pollution and toxic chemicals in air, water, food and consumer products.

This vision is a far cry from the reality today. For too long, chemicals have been allowed into everyday products before being shown to be safe. More than 80,000 chemicals are available for use, but not even 3% have been tested for health impacts and only five have been regulated under the main U.S. chemical safety law.

Public policies have also been sadly inadequate to protect people from the pollution and associated health impacts of fossil fuel combustion and oil and gas operations.

Many serious health conditions are on the rise today, including asthma and other respiratory diseases, diabetes, heart disease, childhood cancers and reproductive disorders. Research indicates that exposure to toxic chemicals and air pollution can contribute to these health risks.[78]

Prevention of exposure during pregnancy, childhood and puberty is crucial.[79] Some chemicals are transferred from a pregnant mother to her developing fetus, and research in the emerging field of epigenetics raises the possibility that health effects from certain chemical exposures could be passed down not only from mother to child but possibly to grandchild and beyond.[80]

Picture a healthier future that comes from removing environmental triggers that lead to disease. By making information about hazards widely available and creating systems that ensure safety first, we can prevent harmful exposure before the damage to our health is done.

The price of pollution today

Our vision of tomorrow

Formulating safer products

Stopping pollution at the source

AT A GLANCE

EDF'S HEALTH VISION

Human health improves through reductions in exposure to harmful chemicals and pollution.

2020 GOAL

Significantly reduce exposures to chemical pollutants in consumer products as well as air and water pollution from fossil fuels, including oil and gas operations and coal-fired power plants.

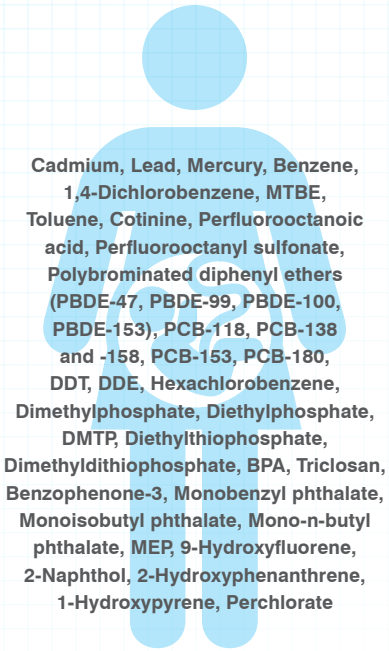
THEORY OF CHANGE

Using the dual levers of public policy and corporate leadership, we can drive harmful substances and practices out of the market and pull safer products and practices into general use.

"In medicine the basic teaching is to 'do no harm.' EDF is working to prevent serious risks to our health and the health of future generations from exposure to air pollutants and toxic chemicals."

Richard Jackson, M.D., M.P.H.
Professor of Environmental Health Sciences, Fielding School of Public Health, University of California, Los Angeles; Former Director, National Center for Environmental Health, CDC

REDUCE HUMAN EXPOSURE TO TOXIC CHEMICALS



Pregnant women are exposed to multiple chemicals of concern, as revealed by blood tests and other biometrics.[81]

EDF will use the dual levers of reforming public policy and spurring corporate leadership to reduce human exposure to toxic chemicals.

In the public policy arena, EDF is working to reform the antiquated federal Toxic Substances Control Act, which has not been updated since 1976. A stronger law should require: prompt action to reduce the use of chemicals known to be of high concern; generation of data on the health effects of inadequately tested chemicals and of new chemicals prior to market entry; and expanded public access to data.

To speed the introduction of safer alternatives to toxic chemicals, EDF will work with corporate partners to influence the retail supply chain. In partnership with Walmart and other industry leaders, we will push consumer product manufacturers to replace toxic ingredients with safer alternatives, promoting production changes that embrace green chemistry principles.[82]

Objectives for 2020

_ New federal legislation is enacted that significantly improves the Toxic Substances Control Act.

_ Federal restrictions are placed on uses of at least a dozen chemicals that pose the greatest health risks, and information on potential risks to humans and ecosystems is publicly available and systematically reviewed by the government for all chemicals in, or entering, commerce.

_ Chemicals of concern are replaced with safer substitutes in more than 10,000 personal care and household products, and this success is expanded to other product categories through the purchasing practices of retailers and improved formulations by manufacturers.

Some of our partners: Earthjustice; The American Congress of Obstetricians and Gynecologists; Program on Reproductive Health and the Environment at the University of California, San Francisco; Walmart.[83]

CUT AIR AND WATER POLLUTION FROM FOSSIL FUELS

Reducing harmful air pollution, such as from coal-burning power plants, will save thousands of lives and prevent hundreds of thousands of asthma attacks. These benefits will go hand in hand with the reduction of greenhouse gas emissions from power plants *(see pp. 12-13)*.

People who live near the increasing number of natural gas production and processing facilities (more than 15 million Americans, according to a recent *Wall Street Journal* estimate) may be exposed to air and water pollution that can trigger respiratory, cardiovascular and other health problems.[84] EDF is working to ensure that people are protected from such exposures.

In addition, the League of United Latin American Citizens (LULAC), the oldest and largest Hispanic organization in the United States, is working with EDF on a community health education initiative focused on the impacts of indoor and outdoor air pollution on asthma in Hispanic communities.

Objectives for 2020

_ Deep reductions in the soot, smog and toxic-forming emissions from coal-fired power plants are secured and defended, achieving a 90% cut in mercury and sulfur dioxide and a 75% cut in oxides of nitrogen from 2005 levels.

_ Additional clean air protections governing oil and gas development, like Colorado's requirement to control or capture emissions, are won at the national and state levels.

_ The incidence of groundwater pollution from new natural gas wells is cut by 80%, and the volume and toxicity of waste spilled, leaked and discharged to surface waters is dramatically reduced.

_ In order to direct future efforts to reduce health impacts from environmental exposures, available information is used to identify high-priority hot spots where communities suffer disproportionately from pollution.

Some of our partners: American Lung Association, Center for Sustainable Shale Development, Conservation Colorado, Earthjustice, Ground Water Protection Council, Pennsylvania Environmental Council, STRONGER, Wyoming Outdoor Council.[85]

Some key efforts outside EDF[86]

Advance practices and policies to curb emissions from U.S. oil refineries *(e.g., Earthjustice)*

Give consumers reliable information on avoiding hazardous exposures *(e.g., Ecology Center)*

Consider indoor and outdoor sources of exposures when siting, designing, operating and maintaining educational facilities for children *(e.g., Healthy Schools Network)*

Develop graduate chemistry curriculums to train future chemists in safer product formulation *(e.g., Beyond Benign)*

Improve near-real-time assessment of human exposures to toxic chemicals and pollution *(e.g., Anderson Lab at Oregon State University)*

WHAT THE FUTURE HOLDS

NEW DIRECTIONS

A PATH TO WIDER ENGAGEMENT

"To be successful in the long run, EDF needs to work with a far broader group of people on issues that matter to them."

Emily Reyna
Senior manager, partnerships and alliances

EXPANDING THE DIVERSITY OF OUR PROGRAM WORK

Some of the communities harmed most by pollution and degradation of the environment are underrepresented greatly in the environmental movement. This needs to change. As the face of America changes, and as power centers shift worldwide, we must listen to new voices and help ensure that all parts of society receive the environmental and economic benefits of new solutions.

Building relationships with new constituencies will be essential, so that our work is relevant to the broadest cross-section of society in the United States and abroad. We will talk with people about their interests and concerns, seeking opportunities to work together where we share common goals.

Some of EDF's work in the United States, China and Brazil already is designed to provide financial and environmental benefits to diverse communities. The examples below are only a small start, however. We will do much more in the next five years to expand this aspect of our work.

_ Help protect residents of New Orleans and other Louisiana coastal communities from the dangers of coastal storms by rebuilding natural infrastructure *(see p. 30)*.

_ Enable economically distressed residents of rural North Carolina to implement energy-efficient retrofits or upgrades, through our work with electric co-ops.

_ Reduce high levels of air pollution in low-income communities around the Port of Houston through a program that can be replicated in other ports.

_ In California, help ensure that at least 25% of the proceeds from the state's cap-and-trade program for climate will be used in ways that benefit disadvantaged communities, such as through efforts to cut pollution, improve health and promote economic development.

_ Defend the rights of indigenous peoples who depend on forests in the Brazilian Amazon, by supporting legal recognition and effective protection of their territories *(see p. 14)*.

_ Work with China's Poverty Alleviation Office to enable poor farmers to earn income by reducing carbon emissions, through improved farming practices and by turning agricultural waste into energy.

WORK WE ARE PHASING OUT

We must be disciplined in choosing the work we do, dropping approaches that aren't succeeding and doubling down on those that are. We also will wrap up efforts that have attained their objectives and phase out work that is best suited to being carried forward by others. A few examples:

_ **VOLUNTARY CARBON MARKETS IN CHINA** Voluntary markets have been overtaken by the launch of seven government-run pilot carbon markets. EDF now will focus entirely on fostering the growth of the government-run pilots, to support the development of a national compliance market for carbon trading.

_ **U.S. FEDERAL COMMERCIAL FISHERIES** By the end of 2016, catch share management will be well established in a large share of U.S. federal commercial fisheries, and fishermen's organizations will be well equipped to work with government to expand this sustainable management to remaining fisheries. At that point, EDF will pass the torch to others.

_ **PRIVATE EQUITY** We have scaled back our in-depth partnerships with private equity firms and have captured best practices in an online tool now available to the entire industry. This work helped change the norms around environmental management and built a network of contacts that we continue to leverage.

_ **SAN FRANCISCO BAY DELTA** We have stepped away from a multistakeholder process, the Bay Delta Conservation Plan, to refocus our time on working directly with farmers, ranchers and water district leaders to obtain more and cleaner water to help restore Bay Delta ecosystems.

_ **CHESAPEAKE BAY FARMING** The farmer networks that we launched in the Chesapeake Bay region now are operating independently of EDF, and they have maintained the reductions in fertilizer pollution that we helped initiate. We now focus on supply chains that can drive this progress more broadly *(see p. 28)*.

_ **VEHICLE POLLUTION** EPA's cleaner car and fuel standards known as Tier 3, finalized in 2014, will achieve important reductions in pollutants that form smog and soot. Since the new standards face no serious legal challenges, we are declaring victory in the long effort to help attain them.

_ **CORPORATE WATER USE** We have wrapped up a three-year partnership with AT&T on how businesses can reduce water and energy use in buildings' cooling systems. To reach a broader audience, our water efficiency toolkit will be made available through the Global Environmental Management Initiative (GEMI).

_ **VIETNAM FARMING** With local partners in the Mekong Delta, EDF has tested rice cultivation practices to reduce greenhouse gas emissions. After 2016, having built local capacity and documented the reductions achieved, we will entrust our role to a broader coalition of partners whose main focus is food production.

THE FOUNDATION OF ALL OUR WORK

EDF PLATFORM

MAKING A DIFFERENCE

"People come to EDF to make things happen. They are drawn by the challenge of taking on the hard problems."

Liza Henshaw
Chief operating officer

Underlying EDF's work are the people, systems and reputation that enable us to achieve our goals. Whether it's about attracting the best staff and partners, designing information systems or building a consensus for new solutions, the platform that supports our work is essential to our success.

Today's difficult environmental challenges—and the aspirational program goals of this new strategic plan—underscore the need to strengthen EDF to operate and perform on a new scale.

People EDF's work requires an increasingly diverse Board, staff and networks, to allow us both to adapt to changing U.S. demographics and to work more effectively around the globe. We will recruit and retain the best people and draw on our staff and partners' varied perspectives and experience to build competencies, relationships and an internal culture that reflects broadly held environmental values.[87]

Learning Because the world is changing at an ever-increasing pace, our staff must make continuous learning part of their daily professional lives. We will foster this with resources, educational experiences, training opportunities and effective metrics for assessment and rewards.

Systems The potential for big data to shed new light on environmental problems and solutions raises the stakes for information technology and other systems. We will improve our capacity to interpret such data. We also will anticipate EDF's needs for collaboration and communication, providing best-in-class IT capabilities accordingly.

Communications A great idea doesn't help the environment until it is adopted and put to work. We will increase our emphasis on communications that raise awareness and build support among a widening range of stakeholders and decision makers.

Financial resources We must continue to practice sound financial management and attract the investment needed to meet complex environmental challenges. We hold ourselves accountable by using rigorous metrics to track return on investment and report outcomes to our donors and the public.

Some of our 2020 objectives

_ EDF is recruiting and successfully competing for a more diverse pool of top-tier candidates from business, government, nonprofit groups and academia across the full spectrum of EDF positions.

_ We are building greater awareness and understanding of environmental issues and positive solutions among our supporters and a range of influential people in business, politics and media.

_ We are engaged in substantive partnerships with diverse constituencies, including environmental justice communities, across our four areas of focus: Climate, Oceans, Ecosystems and Health.

_ An integrated business analysis and reporting platform is in place that allows real-time access to financial, HR and program information, linking this to environmental outcomes.

CONCLUSION

A CRITICAL MOMENT

If we fail to cure the Earth's environmental ills, it won't be because we lacked the needed remedies. It will be because we failed to act in time.

The challenges may be daunting, but new technologies and policy approaches have the power to address them. We must act now to put those new solutions to work.

Dedicated people at thousands of organizations around the globe are contributing to the effort to meet these challenges, along with fishermen, farmers, business leaders, activists, government officials—indeed, people from all walks of life.

We are joined together by the vision of a healthier home for ourselves, for our children and for future generations. It is a vision all of us can share, regardless of age, nationality, occupation or political party.

Please talk with others, take action in your own community and support the organizations working toward these ambitious goals. Each time you do, you will bring the vision one step closer to reality.

SUMMARY OF PROGRAM GOALS*

CLIMATE

Energy use in China (pp. 10–11)

_ Carbon dioxide emissions are capped at 2015 levels for a group of economic sectors and/or regions responsible for at least half of such emissions in China.

_ Energy efficiency is improved by 25%, compared with 2015 levels, as measured by an economy-wide energy intensity index.

_ 35% of China's primary energy mix comes from renewable energy, natural gas and nuclear, up from 15% in 2013.

Energy use in the United States (pp. 12–13)

_ *Overarching objective:* U.S. carbon dioxide emissions from energy use are 20% below 2005 levels by 2020.

_ By 2016, new national standards are in place that reduce carbon dioxide pollution from fossil fuel power plants by 30% or more, relative to 2005 levels.

_ Lock in, by 2018, an 8% to 13% reduction in overall U.S. carbon dioxide emissions below 2005 levels, by promoting strategic energy management practices and reforming public utility policies.

_ Expand California's carbon market to cover 85% or more of emissions of climate pollutants; extend the carbon cap to 2030 or beyond; and leverage success in California and other states to build toward national climate action.

Forests in Brazil and the Amazon (pp. 14–15)

_ *Overarching objective:* Zero net carbon dioxide emissions from deforestation in Brazil and the entire Amazon by 2020.

_ By the end of 2015, Brazil agrees to a national target of zero net deforestation in 2020.

_ By 2017, California allows jurisdictional REDD credits to be used for compliance in its carbon market.

_ By 2017, 50% of the beef and 25% of the soybeans produced in Brazil are from jurisdictions on track to qualify as zero deforestation zones by 2020.

Limit near-term warming (p. 16)

_ Methane emissions across the U.S. natural gas supply chain are reduced to 1% or less of total gas produced, which we believe will cut today's emission rate at least in half.

_ Methane leakage rates are quantified globally for the oil and gas sector, and companies or countries representing 40% of the global market are committed to measuring, reporting and reducing methane emissions.

*Unless noted, objectives are for the year 2020.

Beyond 2020, drive further reductions (pp. 18–19)

_ *Overarching objective:* By 2020, one quarter of the world's carbon dioxide emissions are covered by durable, declining limits achieved with a carbon price, on track to having one half of emissions covered by 2030.

_ U.S. federal legislation is enacted that will reduce the country's emissions at least 33% below 2005 levels by 2025 and achieve continuous reductions thereafter.

_ Half of China's carbon dioxide emissions are capped at 2015 levels.

_ A major economy with strategic ties to the United States, such as Mexico or Canada, adopts policies at the national level capping emissions from one or more major sectors.

_ Key nations implement a global market-based approach to reduce greenhouse gas emissions from international aviation (which the International Civil Aviation Organization will have adopted by 2016).

_ Emerging economic giants including Brazil have laid the foundation for national carbon markets by implementing monitoring, reporting and inventory provisions, instituting pilot programs and creating incentives for early emissions reductions from key sectors.

OCEANS (pp. 20–25)

_ Governments representing nearly a third of the world's catch have adopted effective policies for sustainable fishing.

_ Twice as many fishermen around the world are fishing sustainably, compared with 2014, benefiting from higher revenues and rebounding fish populations.

_ The precedent is set that sustainable fisheries are a good investment, catalyzing a wave of new and realigned capital into the market to support reforms.

ECOSYSTEMS

Make fertilizer pollution obsolete (p. 28)

_ Walmart, food companies and agribusinesses adopt policies that drive improved fertilizer practices on at least half of U.S. corn acreage.

_ North American carbon markets adopt protocols leading to improved efficiency on farms and ranches, reducing greenhouse gas emissions by an amount equivalent to keeping one million cars off the road.

Increase habitat on working lands (p. 29)

_ All habitat exchanges are meeting or exceeding goals for rebuilding target species.

_ Five of eight Fish and Wildlife Service regions, covering 90% of federally listed candidate species, adopt habitat exchanges or their equivalent.

_ $100 million annually in mitigation funding under the Endangered Species Act is invested in projects using habitat exchanges or equivalents.

Protect coastal communities (p. 30)

_ $3 billion is being invested effectively on an annual basis in the design or construction of natural infrastructure to reduce coastal risks.

_ Effective design standards for natural coastal infrastructure are adopted by the major agencies that finance or approve infrastructure and by professional organizations.

HEALTH

Reduce human exposure to toxic chemicals (p. 34)

_ New federal legislation is enacted that significantly improves the Toxic Substances Control Act.

_ Federal restrictions are placed on uses of at least a dozen chemicals that pose the greatest health risks, and information on potential risks to humans and ecosystems is publicly available and systematically reviewed by the government for all chemicals in, or entering, commerce.

_ Chemicals of concern are replaced with safer substitutes in more than 10,000 personal care and household products, and this success is expanded to other product categories through the purchasing practices of retailers and improved formulations by manufacturers.

Cut air and water pollution from fossil fuels (p. 35)

_ Deep reductions in the soot, smog and toxic-forming emissions from coal-fired power plants are secured and defended, achieving a 90% cut in mercury and sulfur dioxide and a 75% cut in oxides of nitrogen from 2005 levels.

_ Additional clean air protections governing oil and gas development, like Colorado's requirement to control or capture emissions, are won at the national and state levels.

_ The incidence of groundwater pollution from new natural gas wells is cut by 80%, and the volume and toxicity of waste spilled, leaked and discharged to surface waters is dramatically reduced.

_ In order to direct future efforts to reduce health impacts from environmental exposures, available information is used to identify high-priority hot spots where communities suffer disproportionately from pollution.

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Back to text

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Back to text

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Back to text

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Back to text

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Back to text

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Georgetown Climate Center provides a leading forum for states, power companies and other stakeholders, such as EDF, to engage in a vibrant and fact-based dialogue. http://www.georgetownclimate.org/node/5683

Institute for Policy Integrity, sponsored by the New York University School of Law, works with EDF and other diverse interests to improve the quality of government decision-making through law and economics. http://policyintegrity.org/issues/filter/energy-environment

Interfaith Power & Light ensures that voices of the faith community are heard in the discussion of a clean energy future. http://www.interfaithpowerandlight.org/public-policy/

Keeping PACE in Texas unleashes the power of private capital by introducing innovative financial products and practices that help avoid the high upfront costs of energy improvements. http://www.keepingpaceintexas.org

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Nicholas Institute for Environmental Policy Solutions at Duke University collaborates with EDF and many

stakeholders to advance policy solutions through multidisciplinary analysis and convening diverse interests. http://nicholasinstitute.duke.edu/climate

Ohio Environmental Council advances energy efficiency and clean energy by advocating for a healthier, more sustainable state before the Public Utilities Commission of Ohio. http://www.theoec.org/CleanEnergy

The Nature Conservancy and EDF have formed a strategic alliance to advance climate solutions by accelerating the U.S. transition to clean energy and rebuilding the political center on climate. http://www.nature.org/energy

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Back to text

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Back to text

FORESTS IN BRAZIL AND THE AMAZON

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Back to text

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Back to text

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Back to text

LIMIT NEAR-TERM WARMING

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Global Alliance for Clean Cookstoves: http://cleancookstoves.org

Back to text

40 Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 659–740, doi:10.1017/CBO9781107415324.018. http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf

Back to text

41 Ibid.

Back to text

42 Methane is 84 times more potent at trapping heat than carbon dioxide for the first two decades after it is released into the atmosphere. Finding and fixing industrial leaks of methane from the oil and natural gas industries can reduce climate change impacts. http://www.edf.org/climate/methane

Back to text

43 ICF International (2014, March). *Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries.* Prepared for Environmental Defense Fund. http://www.edf.org/icf-methane-cost-curve-report

Back to text

44 BlueGreen Alliance and EDF have partnered to push for stronger regulations to detect and repair leaks from natural gas pipelines in California. http://www.bluegreenalliance.org/news/latest/bi-partisan-vote-approves-legislation-to-find-and-fix-natural-gas-leaks

Clean Air Task Force and EDF are working together to secure federal regulations to reduce methane pollution from the oil and gas industry. http://www.catf.us/methane/methane/oil_and_gas

Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (known as CCAC) is comprised of more than 40 nations and 50 non-state partners (including EDF). Its Oil & Gas Methane Partnership, launched in September 2014, helps participating companies minimize methane emissions from oil and gas production. http://www.unep.org/ccac/Initiatives/CCACOilGasInitiative/tabid/794015/Default.aspx

Google Earth Outreach and EDF deployed sensors on Google Street View cars to map methane leaks in U.S. cities. http://www.edf.org/climate/methanemaps

Natural Resources Defense Council and EDF are working together to secure federal regulations to reduce methane pollution from the oil and gas industry. http://www.nrdc.org

The Nature Conservancy and EDF are working together to secure stronger regulation of natural gas production and distribution. http://www.nature.org

The Wyoming Outdoor Council partnered with EDF to advocate stronger state regulations of oil and gas operations. http://wyomingoutdoorcouncil.org/2014/07/11/guest-column-part-i-a-promising-proposal-for-fixing-air-pollution-in-the-upper-green

Back to text

45 In 2014, EDF staff identified four emerging areas as most important for EDF to pursue: considering ethnic and cultural diversity in environmental advocacy and outreach; expanding our use of social and behavioral science through different levels of analysis; harnessing big data and sensors for environmental benefits; and advancing the science of climate change attribution. See http://edf.org/emergingissues

Back to text

46 Alvarez, R. A., Pacala, S. W., Winebrake, J. J., Chameides, W. L., & Hamburg, S. P. (2012). Greater focus needed on methane leakage from natural gas infrastructure. *Proceedings of the National Academy of Sciences,* 109(17), 6435-6440. http://www.pnas.org/content/109/17/6435.full.pdf

Back to text

47 The projects examine all areas of the natural gas supply chain: production; gathering lines and processing facilities; long-distance pipelines, storage, and local distribution; as well as some end users using natural gas, commercial trucks and refueling stations. As study results start to emerge, we are learning that practical, cost-effective solutions are possible now. http://www.edf.org/climate/methane-studies

Back to text

48 EDF and Google Earth Outreach announced the first results of a pilot partnership to explore and unlock the potential of new sensing and analytical technologies to measure key environmental data, and to make that data more widely available. The initial project used sensors attached to Google Street View cars to create detailed maps of places where natural gas is leaking from utility pipes under city streets. http://www.edf.org/climate/methanemaps/partnership

Back to text

BEYOND 2020, DRIVE FURTHER REDUCTIONS

49 Carbon Capture and Sequestration Technologies Program at MIT: http://sequestration.mit.edu

Climate Action Network: http://www.climatenetwork.org/about/can-charter

League of Conservation Voters Education Fund: http://www.lcvef.org/civic_engagement

Citizens for Responsible Energy Solutions: http://www.citizensfor.com

Risky Business Project: Michael R. Bloomberg, Henry Paulson and Tom Steyer co-chair the Risky Business Project. http://riskybusiness.org/report/overview/executive-summary

Back to text

50 Allen, M. et al. (2009). https://www1.ethz.ch/iac/people/knuttir/papers/allen09nrcc.pdf

Back to text

51 Moms Clean Air Force is an advocacy network for parents concerned about air pollution and climate change. Through blogs, online petitions and in-person activism, parents can learn about the issues and take action to protect their children and future generations. http://www.momscleanairforce.org

Back to text

52 Aviation Environment Federation (UK) is a key partner with EDF in the multi-NGO International Coalition for Sustainable Aviation and is engaging with forward-looking industry representatives and policymakers on the International Civil Aviation Organization's efforts to address carbon pollution from international flights. http://www.aef.org.uk/issues/climate

The International Emissions Trading Association (IETA), a nonprofit business organization with 140+ members, works to develop an emissions trading regime that results in real and verifiable greenhouse gas emission reductions, while balancing economic efficiency with environmental integrity and social equity. http://www.ieta.org

The Center for Sustainability Studies of the Getúlio Vargas Foundation conducts carbon market simulations, and EDF is a member of its technical advisory committee. http://www.empresaspeloclima.com.br/index.php?r=site/conteudo&id=114 *(in Portuguese)*

The Nature Conservancy and EDF are working together to build support for action toward more ambitious U.S. carbon emissions reductions at the federal level. http://www.nature.org/ourinitiatives/urgentissues/global-warming-climate-change/policy/index.htm

Back to text

53 By cultivating unlikely political support and mobilizing concerned citizens, EDF Action works toward revitalizing our fragile wetlands, reducing toxic chemicals and delivering climate change solutions big and small. http://www.edfaction.org/about-us

Back to text

OCEANS

54 The World Bank & FAO. (2009). *The sunken billions: the economic justification for fisheries reform.* Washington, DC: The International Bank for Reconstruction and Development / The World Bank. http://siteresources.worldbank.org/EXTARD/Resources/336681-1224775570533/SunkenBillionsFinal.pdf

Back to text

55 Worm, B., Hilborn, R., Baum, J. K., Branch, T. A., Collie, J. S., Costello, C., ... & Zeller, D. (2009). Rebuilding global fisheries. *Science*, 325(5940), 578–585. http://www.sciencemag.org/content/325/5940/578.abstract

Back to text

56 Ibid.

Costello, C., Ovando, D., Hilborn, R., Gaines, S. D., Deschenes, O., & Lester, S. E. (2012, October 26). Status and Solutions for the World's Unassessed Fisheries. *Science*: 338(6106), 517-520. http://www.sciencemag.org/content/338/6106/517.abstract

Also see http://www.seaaroundus.org/global/1/101.aspx

Back to text

57 Food and Agriculture Organization of the United Nations. (2014). *Global Capture Production*. [Data set]. http://www.fao.org/fishery/statistics/global-capture-production/en

Back to text

58 Unpublished analysis by EDF and the University of California, Santa Barbara.

Back to text

59 Ibid.

Back to text

60 Beddington, J. R., Agnew, D. J., & Clark, C. W. (2007). Current problems in the management of marine fisheries. *Science*, 316(5832), 1713–1716. http://www.sciencemag.org/content/316/5832/1713.full

Back to text

61 Red snapper: National Oceanic and Atmospheric Administration, NOAA Fisheries. (2014). http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/red_snapper/overview/index.html

Pacific groundfish: Intertek (2013, June). http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/us_west_coast_limited_entry_groundfish_trawl/assessment-downloads-1/20140602_PCR_V2_GRO223.pdf

See also http://www.edf.org/oceans/hope-gulf-reef-fish and http://blogs.edf.org/edfish/2014/09/02/from-avoid-to-enjoy-west-coast-groundfish-completes-sustainability-sweep

Back to text

62 National Oceanic and Atmospheric Administration, NOAA Fisheries. (2013). *Status of Stocks* 2013. pp. 1–8. http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/archive/2013/status_of_stocks_2013_web.pdf

Back to text

63 Conservation International uses science, economics and policy to support human well-being by securing reservoirs of natural capital. CI works with nations, the private sector, communities and governments to ensure that ecosystems are healthy and protected; that the business sector operates sustainably and that governments ensure the security of their ecological functions and systems. http://www.conservation.org/what/pages/oceans.aspx

Aquaculture Stewardship Council: http://www.asc-aqua.org/index.cfm?act=tekst.item&iid=2&iids=385&lng=1

Marine Stewardship Council: http://www.msc.org/get-certified

Monterey Bay Aquarium's Seafood Watch: http://www.seafoodwatch.org

Back to text

64 Environmental Defense Fund, The Prince of Wales's International Sustainability Unit and 50in10. (2014). *Towards Investment in Sustainable Fisheries: A Framework for Financing the Transition. Discussion Document.* http://www.pcfisu.org/wp-content/uploads/2014/07/Towards-Investment-in-Sustainable-Fisheries.pdf

Back to text

65 Members of the Gulf of Mexico Reef Fish Shareholders' Alliance and EDF work together to promote fishery management tools that ensure long-term conservation of fish populations in ways that make the most sense for fishermen and their businesses. http://shareholdersalliance.us/SA

The International Sustainability Unit of The Prince of Wales's Charitable Foundation and EDF in partnership have provided a framework for scaling up investment in the transition to sustainable fisheries that will stimulate the rapid growth of projects that address this challenge and that are urgently required to meet the needs of the three billion people who rely on fish for their primary source of animal protein and the 300 million people who are involved in the sector. http://www.pcfisu.org/marine

EDF has partnered with Rare to support the Fish Forever initiative, which aims to bring Rare's sophisticated and proven social marketing strategies to help small scale fisheries adopt sustainable solutions. http://www.rare.org

Sustainable Fisheries Group, University of California, Santa Barbara deploys world class expertise in bioeconomic modeling and fisheries science to partner with EDF in developing groundbreaking science on understanding the state of global fisheries and uncovering the conservation and economic potential of reform. UCSB is also a partner in the Fish Forever initiative. http://sfg.msi.ucsb.edu

WWF Spain and EDF have a formal collaboration with the goal of improving fishermen's livelihoods and protecting marine ecosystems by transforming Spanish coastal fisheries to sustainable fishing practices. http://www.wwf.es *(in Spanish)*

Back to text

ECOSYSTEMS

66 The median estimate for global population is 9.6 billion people by 2050, with a range from 8.3 to 10.9. Source: United Nations Department of Economic and Social Affairs, Population Division. (2013). *World Population Prospects: The 2012 Revision: Highlights and Advance Tables.* Working Paper No. ESA/P/WP.228. http://esa.un.org/unpd/wpp/Documentation/pdf/WPP2012_HIGHLIGHTS.pdf

Current population data from: United States Census Bureau. World Population Clock. http://www.census.gov/popclock

Back to text

67 Taxpayers for Common Sense: http://www.taxpayer.net/issues/agriculture

Sustainable Table: http://www.sustainabletable.org/1486/about-sustainable-table

Environmental Working Group: http://www.ewg.org/farming-and-the-environment/the-case-for-farm-subsidy-reform

Back to text

68 A large portion of Walmart's committed greenhouse gas reduction will come from using fertilizer more efficiently by requiring that suppliers of products that use commodity grains develop plans to optimize fertilizer use on farms. http://business.edf.org/projects/featured/sustainable-supply-chains-and-walmart/greening-agricultural-supply-chains

Back to text

69 EDF is a member of, and is working with, Field to Market, a diverse alliance working throughout the agricultural supply chain, to develop industry-wide metrics

and initiatives to improve productivity, sustainability and human well-being. http://www.fieldtomarket.org

General Mills and EDF work together to implement a fertilizer optimization program for wheat, corn and soybeans in the Lake Erie Basin. http://www.generalmills.com

United Suppliers, a wholesale organization owned by 670 agricultural retailers, and EDF collaborate to maximize fertilizer efficiency on ten million U.S. acres by 2020. http://www.unitedsuppliers.com

Walmart is working with EDF to reduce the company's greenhouse gas emissions, in particular by focusing on fertilizer use in its supply chain. http://corporate.walmart.com/global-responsibility/environment-sustainability/sustainable-agriculture

WWF is working with EDF on a sustainable sourcing project with Coca-Cola and ADM to optimize fertilizer use. http://www.worldwildlife.org/initiatives/food

Back to text

70 Habitat exchanges offer win-win-win solutions: a species has ample, safe habitat, a landowner has gained a new way to earn income, and the developer can proceed with plans. http://www.edf.org/ecosystems/smarter-way-save-habitat-and-wildlife

Back to text

71 American Rivers is working with EDF to develop the Central Valley Habitat Exchange, which will create profitable opportunities for farmers and ranchers to improve habitat. https://www.enviroaccounting.com/cvhe/Program/Home

Colorado Cattlemen's Association and EDF are working together to develop and launch a habitat exchange for the greater sage-grouse. http://www.thepwc.org

The National Mitigation Banking Association shares EDF's interest in pressing the federal government and state governments to mitigate for impacts to listed and candidate species using high and consistent standards equivalent to or exceeding existing conservation banking standards. http://www.mitigationbanking.org/conservationbanks

Environmental Defense Fund is collaborating with researchers from the University of Wyoming and other local partners to create the Wyoming Conservation Exchange. http://www.wyomingconservationexchange.org

Back to text

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Back to text

73 Defenders of Wildlife: http://www.defenders.org/endangered-species-act/endangered-species-act

National Audubon Society: http://www.audubon.org/citizenscience

National Wildlife Federation: http://www.nwf.org/How-to-Help/Garden-for-Wildlife.aspx

Back to text

74 The Water Institute of the Gulf: http://www.thewaterinstitute.org

Greater New Orleans, Inc.: http://gnoinc.org/initiatives/gno-inc-initiatives/ccre

Restore or Retreat: http://www.restoreorretreat.org/solutions

Back to text

75 Both the benefits of coastal restoration and the costs of inaction are high. Jobs and the value of ecosystem goods and services are at risk from storm damage and coastal deterioration if we do not recreate a strong natural infrastructure. http://www.mississippiriverdelta.org/files/2012/07/Question-8.pdf

Back to text

76 Coalition to Restore Coastal Louisiana advances coastal restoration through policy advocacy, science and volunteer wetland restoration programs. http://www.crcl.org

Lake Pontchartrain Basin Foundation focuses on science and restoration in the basins north and east of New Orleans. http://www.saveourlake.org

Lower 9th Ward Center for Sustainable Engagement and Development and EDF collaborate to restore New Orleans' Lower 9th Ward to a safe, environmentally resilient and economically vibrant community. http://www.sustainthenine.org

National Audubon Society focuses on bird habitat and science relative to the Delta. http://www.audubon.org

National Wildlife Federation brings habitat science and experience to the coastal effort. http://www.nwf.org

Back to text

77 Farmers, despite record drought in the arid Southwest, have begun to adapt through innovative drought mitigation and water-saving practices, proving that increased productivity and healthy ecosystems can coexist. http://blogs.edf.org/growingreturns/2014/08/15/stories-of-young-farmers-water-and-resilience

Back to text

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78 Dentzer, S. (Ed.). (2011). Environmental Challenges For Health [Special issue]. *HealthAffairs,* 30(5). http://content.healthaffairs.org/content/30/5.toc

Back to text

79 The American College of Obstetricians and Gynecologists Committee on Health Care for Underserved Women and the American Society for Reproductive Medicine Practice Committee. (2013, October) *Committee Opinion: Exposure to Toxic Environmental Agents.* No. 575. http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Health-Care-for-Underserved-Women/Exposure-to-Toxic-Environmental-Agents

Back to text

80 Schmidt, C. W. (2013, October). Uncertain inheritance: transgenerational effects of environmental exposures. *Environmental Health Perspectives*. 121(10): 298-303. http://ehp.niehs.nih.gov/121-a298

Back to text

81 Woodruff, T. J., Zota, A. R., & Schwartz, J. M. (June 2011). Environmental chemicals in pregnant women in the United States: NHANES 2003-2004. *Environmental Health Perspectives.* 119(6): 878–885. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3114826

Back to text

82 EDF's collaboration with Walmart has helped the company launch a sustainable chemicals policy that targets about ten chemicals of concern in consumer products for replacement with safer ingredients. http://www.edf.org/health/walmart-partnership-leads-safer-products

Back to text

83 Earthjustice and EDF work together to ensure that information on chemical safety is widely available, pressing EPA to make full use of its available powers. http://earthjustice.org/healthy-communities/toxic-chemicals/regulatory-system

The American Congress of Obstetricians and Gynecologists and EDF work to reform legislation to reduce the impact of toxic chemicals on infants and pregnant women. http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Health-Care-for-Underserved-Women/Exposure-to-Toxic-Environmental-Agents

The Program on Reproductive Health and the Environment at the University of California, San Francisco and EDF work to ensure that government officials use the best scientific practices to evaluate the safety of chemicals. http://prhe.ucsf.edu/prhe/navigationguide.html

Walmart and EDF partner to drive use of safer chemicals in consumer products. http://www.walmartsustainabilityhub.com/app/answers/detail/a_id/303

Back to text

84 Alvarez, R. A. & Paranhos, E. (2012, June). Air Pollution Issues Associated. *EM Magazine.* EM Magazine is a publication of the Air & Waste Management Association (A&WMA; http://www.awma.org). To obtain copies and reprints, please contact A&WMA directly at 412-232-3444.

Back to text

85 American Lung Association and EDF partner to advocate and defend strong clean air standards to provide healthier and longer lives for millions of Americans. http://www.lung.org/healthy-air/outdoor/fighting-for-healthy-air/fighting-for-healthy-air.html

Center for Sustainable Shale Development is a coalition of oil and gas companies and environmental groups

working to develop leading practices that exceed regulatory requirements and certify operators that meet those standards. EDF serves on the Center's board and technical committees. https://www.sustainableshale.org

Conservation Colorado and EDF have worked together to secure stronger air quality regulations for Colorado. http://conservationco.org

Earthjustice and EDF work together to enforce and defend the nation's clean air laws. http://earthjustice.org/advocacy-campaigns/clean-air

Ground Water Protection Council is a key association of state water and oil and gas regulators that studies, coordinates and develops recommendations for state policy consideration on oil and gas issues and other issues pertaining to the protection of groundwater. http://www.gwpc.org

Pennsylvania Environmental Council and EDF have partnered to advance Pennsylvania's regulation of performance standards at oil and gas well sites. http://www.pecpa.org

STRONGER is a multi-stakeholder group in which EDF participates that develops guidelines covering various aspects of oil and gas development and conducts reviews of state programs on request. http://www.strongerinc.org

Wyoming Outdoor Council and EDF are partnering to advocate for stronger air pollution control measures for the state's oil and gas industry. http://wyomingoutdoorcouncil.org/2014/07/11/guest-column-part-i-a-promising-proposal-for-fixing-air-pollution-in-the-upper-green

EDF will forge additional partnerships in future efforts to reduce exposure to pollution and toxic chemicals. These efforts will draw on information such as EPA's urban air toxics assessment. http://www2.epa.gov/urban-air-toxics/second-integrated-urban-air-toxics-report-congress

Back to text

86 Earthjustice: http://earthjustice.org/slideshow/fighting-for-clean-air-in-the-shadow-of-oil-refineries

Ecology Center, developing innovative solutions for healthy people and a healthy planet. http://www.ecocenter.org/healthy-stuff

Healthy Schools Network: http://www.healthyschools.org

Beyond Benign: http://www.beyondbenign.org/professional/academia.html

Anderson Lab at Oregon State: http://fses.oregonstate.edu/current-projects

Back to text

87 EDF's Diversity Strategy Working Group developed a comprehensive diversity strategy and recommendations in 2014. http://www.edf.org/diversityplan

Back to text

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