

SOLUTIONS



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Your package has arrived

The world's dependence on maritime shipping weighs heavily on the environment. Can the industry clean up in time?

ALSO INSIDE: Remembering an EDF founder | Methane: The hunt is on | Green online shopping tips



Unsung heroes of the deep

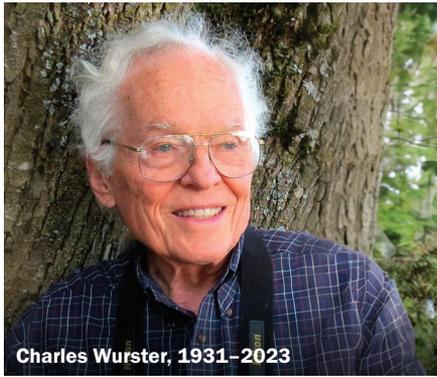
Between the ocean's shimmering surface and its darkest reaches exists a twilight zone where small, abundant creatures dwell at depths of 650 to more than 3,000 feet. Creatures like this opah (*Lampris guttatus*) belong to that group, collectively known as mesopelagic fish. They promote carbon storage by eating smaller animals and releasing waste, which sinks to the seabed and, if not disturbed, stays there for millennia. Estimates suggest these fish may capture about as much carbon as the U.S. emits each year. EDF is supporting research into the ocean carbon cycle and effective ways to conserve the fish that keep climate-warming carbon locked deep undersea.

A legacy of determination

Things are changing. As I write this, we've just experienced a summer of record-breaking heat. Off the coast of Florida, the ocean temperature reached 101 degrees.

Many of these changes are happening even faster than climate scientists predicted. It's a troubling reminder that we need fast-acting solutions.

That's why EDF is on a global quest to find methane (*see p. 12*) — because cutting methane emissions offers the quickest way to slow warming right now. (Of course, to stabilize the climate, we need to act fast to reduce both long-acting carbon dioxide pollution and short-lived methane.)



WURSTER FAMILY

Our work in that direction recently took a major step forward with the introduction of MethaneAIR, a high-flying jet dedicated solely to methane detection. And early next year, EDF subsidiary MethaneSAT will launch a satellite to scan the globe for methane. Together, these new tools will help ensure that reductions happen as quickly as possible.

I started this letter by talking about change, and EDF also experienced a big change this year. In July, we lost our last living co-founder, Dr. Charles Wurster, at the age of 92. A gifted scientist, Charlie helped found EDF in 1967, and laid the bedrock for EDF's data-driven approach to advocacy.

Charlie's book, *DDT Wars*, is an account of EDF's battles that led to the U.S.-wide ban of the toxic pesticide DDT in 1972, and the subsequent recovery of birds of prey like the osprey. At the time, using the law to bring about environmental change was a relatively novel idea. But EDF's success heralded a new era in which environmentalists harnessed the power of the courts to protect both people's health and the planet.

Over the years, Charlie would often marvel at how EDF's impact exceeded his wildest dreams. What started as a local effort had grown into a global organization tackling the huge, existential crisis that is climate change.

This issue's cover story on EDF's role in cutting emissions from the global shipping industry is another clear illustration of how much the scope of our work has grown (*see p. 8*).

Charlie was a man of legendary perseverance. Without him, the ban on DDT might not have been won, and EDF might not have been born.

So, in all we do going forward, we will honor Charlie's legacy by successfully persisting in our work to bring about change at scale.

Fred Krupp
EDF President

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On the cover: The Port of Long Beach, California, is one of many ports worldwide working to reduce climate and air pollution. Photo: Getty Images

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SOLUTIONS

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Mile-high ambition

Colorado has become the latest state to put in place climate targets that set it on a steadily declining path to net zero climate pollution by 2050.

EDF worked alongside Sen. Chris Hansen and other sponsors to write the bill and build public approval. We also developed technical analyses of the bill's effects and provided public testimony in support of the legislation.

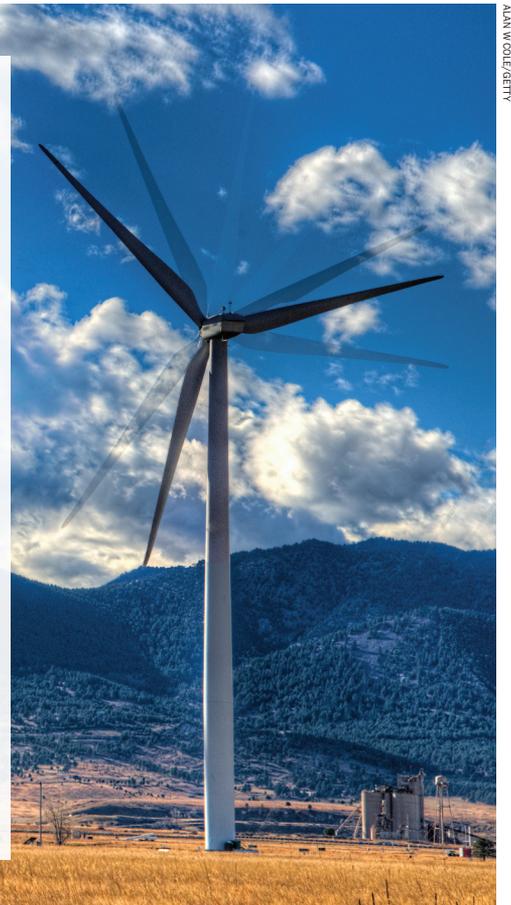
The new law increases in ambition every five years — starting with a 65% reduction by 2035 — giving the state immediate, near-term goals. This is important because delaying climate action has real consequences: Greenhouse gases build up in the atmosphere over time, further destabilizing the climate and endangering lives and livelihoods.

“How we get to net zero matters,” says Alex DeGolia, a director on EDF’s U.S. Climate team. “Colorado’s new law prioritizes getting on the right path now and building in accountability down the line.”

Colorado joins six other states with net zero climate targets, including New York, California, Maryland, and most recently, Delaware.

The Colorado bill was one of several passed in the state’s last legislative session that focus on climate and clean energy. Others include tax credits for residents looking to adopt clean energy technologies like electric vehicles and heat pumps for heating and cooling. Coloradans can combine these incentives with existing federal ones made available through the Inflation Reduction Act.

“Coloradans are all too familiar with the devastation of climate change-fueled droughts and wildfires,” said DeGolia. “With these bills, state leaders are promising to step up Colorado’s climate fight and safeguard our communities for years to come.”



ANAN W. COLE/EDF

EDF’s Climate Corps program, which embeds graduate students at companies to help improve their environmental performance, placed its first fellows in China only a decade ago. Now, 201 future sustainability leaders have helped 47 major Chinese companies, including Walmart China, cut climate pollution by more than half a million metric tons. That’s the equivalent of taking 110,000 cars off U.S. roads for a year.

CLIMATE CORPS CHINA TURNS 10!



EDF CLIMATE CORPS CHINA

Abandoned oil well cleanup begins

Bill Suan’s decades-long struggle to clean up leaking oil and gas wells on his West Virginia farm is finally over. Two wells on his land are among the 2,500 abandoned, polluting oil and gas wells that workers have plugged so far across Appalachia, the Gulf states and the West — thanks to \$4.7 billion in federal funding EDF was instrumental in securing. More wells — which can cost anywhere from tens of thousands of dollars to upwards of \$1 million to plug and remediate — are being sealed every day.

“I was amazed at how every detail was taken care of,” said Suan.

An unplugged oil or gas well can leak toxic and carcinogenic chemicals into the air, contaminate groundwater and emit methane, a climate pollutant that has more than 80 times the warming power of carbon dioxide in the first 20 years after it is released. The new funding is enabling dozens of states to address a decades-long backlog of pollution from “orphan” wells — wells without solvent owners to clean them up.

Experts estimate there are more than a million orphan wells nationwide, with hundreds of thousands more at risk of becoming orphans in the coming decades. And while the funding won’t take care of every one of them, it includes incentives for states to rein in the growing problem. EDF is working with state regulators to create policies that will prevent future orphan wells, including requiring oil and gas companies to deposit more money up front with states for plugging.



Bill Suan on his West Virginia farm.

MOHAMMAD SHIRHOSEEN



California is making its emissions-slashing cap-and-trade program even better, with EDF's help.

A pioneering pollution solution gets stronger

IT HAS BEEN 10 YEARS SINCE CALIFORNIA became the first state in the nation to launch an economy-wide cap-and-trade program to slash climate pollution. Over that decade, the state has dramatically reduced its emissions, grown its economy, raised \$23 billion for environment and public health programs and served as a model for several other states looking to combat climate change by charging polluters.

This summer, California's regulators began the process to update and strengthen the program for the next 10 years and beyond. EDF was one of the two original sponsors of the legislation that established the market. Over the years, we have defended it from numerous legal and political challenges and are now pushing to make the system as ambitious, effective and equitable as possible.

California's cap-and-trade program sets a limit on climate pollution, covering 80% of the state's emissions. The limit declines every year and regulated businesses — large electric power plants, industrial factories and fuel distributors — must either reduce their pollution or

pay for so-called emissions allowances.

"The most important thing California regulators need to do now is significantly shrink the number of new pollution allowances they sell," says Katelyn Roedner Sutter, EDF's California State Director. EDF is also urging state regulators to speed up the pace of those reductions in order to keep up with the speed and scale of climate change.

This step builds on the achievements of the program so far.

"California is a real success story," says Roedner Sutter. "We hit our 2020 emissions reduction goal four years ahead of schedule, and far from stunting our economic growth, we're now poised to become the fourth-largest economy in the world."

California may also be able to boost its ambition by linking its market with a similar one Washington state launched recently. California's market is already linked with that of Quebec, meaning the two markets pool their supply of allowances and conduct shared auctions.

The efficiencies created by linking with Washington as well could drive deeper cuts in climate pollution, lower costs and increase the stability of the carbon market overall.

EDF is also urging California to take steps to help alleviate air pollution hot spots in the state.

California's system is intentionally designed so that businesses can cut climate pollution in the most cost-effective way possible. But this means that not every power plant or cement factory is reducing its emissions at the same rate. And since climate pollution is often released alongside health-harming air pollution, some communities are forced to breathe unhealthy air. EDF is proposing facility-specific emissions limits, so that individual factories or power plants that are identified as significant sources of local air pollution in already overburdened communities would have to reduce their emissions at the same rate as the state as a whole.

Getting the program design right is essential to California's success in combating the climate crisis. "Our 2030 goal is considerably more ambitious than our 2020 goal was, and the reality is we will need to exceed even that goal to have a chance of reaching net zero emissions by 2045 as required by state law," says EDF's Roedner Sutter.

"California has a lot of climate policies and programs. But at the end of the day, it's our cap-and-trade program that guarantees we will meet our goals."

Joanna Foster



THE WILSON LEGACY

This feature honors the memory of Robert W. Wilson, a long-time EDF supporter and champion of harnessing market forces to drive environmental progress. See edf.org/wilson



Traditional aquaculture, like the kind practiced in this pond on Hawaii's Molokai Island, can help meet growing demand for sustainably-farmed seafood.

MICKEY PAUOLE

From sea to table

EDF is driving support for a sustainable aquaculture industry in the U.S.

By Tom Clynes

ACCORDING TO HAWAIIAN FOLKLORE, Ku'ula-kai was a divinely-inspired fisherman who built the first fishpond, or "loko ia". Ku'ula-kai discovered that if he built an enclosure at the point

where freshwater flows into the ocean, he could attract and capture juvenile fish that eat the small creatures that thrive in brackish water.

Hawaiian fishponds are one of the world's many traditional forms of aquaculture — the rearing of aquatic animals or cultivation of aquatic plants for food. Australian Aboriginal communities built channels to rear eels as early as 8,000 years ago, and in Japan, Tokyo Bay seaweed farmers planted bamboo branches in shallow water to attract seaweed spores as early as 1670.

In Hawaii, fishpond use declined after the arrival of Westerners, due to development and cultural changes. But today, a movement to restore fishponds is reviving the spirit of Ku'ula-kai across the chain of tropical islands, even as the state and its residents work to recover from this summer's devastating wildfires. Many of these new aquaculturists are combining traditional culture with modern science to farm fish in a way that is both productive and environmentally sound.

"Our vision is abundant and healthy ecological systems that contribute to community well-being," says marine scientist Brenda Asuncion of Kua'āina Ulu 'Auamo, a nonprofit which helps Hawaiians improve their quality of life through caring for their natural and cultural heritage.

It's a vision that EDF shares.

Communities in what is today the United States have employed traditional aquaculture practices to produce seafood for centuries.

Yet the country ranks only 18th in the world for aquaculture production. We import up to 90% of the seafood we eat and much of it comes from places where commercial aquaculture is executed in a way that threatens marine ecosystems, endangered species and traditional fishing communities.

"While aquaculture is not without risks, if done right, it can be a win for both people and ecosystems," says EDF's director of seafood and aquaculture policy, Ruth Driscoll-Lovejoy.

Aquaculture can help meet the growing demand for seafood as wild fish stocks continue to decline. It can reduce wasteful bycatch — the fish and marine



Marine scientist Brenda Asuncion.

BRENDA ASUNCION

mammals that get caught in industrial fishing nets only to suffocate and be thrown back in the sea. Additionally, farming seaweed and bivalves such as oysters, clams and mussels can filter water and sequester nitrogen and carbon while also providing inexpensive protein.

Aquaculture can also create jobs and provide abundant, locally-sourced food.

“ Our vision is abundant and healthy ecological systems that contribute to community well-being. ”

— Marine scientist Brenda Asuncion of Kua‘āina Ulu ‘Auamo

The key is the right regulatory framework — and the right voices at the table. There are currently no comprehensive laws to guide the growth of a substantial offshore aquaculture industry in the United States. This has stymied aquaculture development and held back research into the impacts of farming in deeper waters and best practices to protect ecosystems.

Recently, the path became a little less murky, with the introduction of a bipartisan measure called the Science-based Equitable Aquaculture Food Act, or SEAfood Act. The legislation, which was supported by EDF’s research and advocacy, would lay the groundwork for an equitable and inclusive seafood economy while prioritizing data and science.

Under the SEAfood Act, on-the-water research projects would help determine how to build and regulate an environmentally safe and effective offshore industry. The act would also establish a grant program for minority-serving institutions to develop leaders and the necessary workforce for a growing aquaculture industry.

As the act moves through the legislative process, Driscoll-Lovejoy and colleagues are working with local communities — including those with traditional and Indigenous knowledge — to ensure their voices are heard. For example, they are advocating for Congress to incorporate local

knowledge into rules that will govern future offshore aquaculture operations.

“A durable and inclusive offshore aquaculture industry must be informed by local communities as well as academic science,” says Driscoll-Lovejoy.

Entities such as Washington state’s Jamestown S’Klallam Tribe have struggled to realize their plans to expand fish farming. In response to a state order banning commercial net pens because of a perceived danger to struggling salmon, the tribe has argued that farming native species such as Pacific steelhead can be accomplished with minimal environmental impacts. In 2022, the National Oceanic and Atmospheric Administration released research results showing that marine finfish aquaculture has little to no negative impact on Puget Sound marine ecosystems and native species such as salmon and orcas.

High demand for high standards

The SEAfood Act is a long way from President Biden’s desk. But as Congress considers the bill, lawmakers will be paying attention to a 2021 EDF survey of 800 voters, which showed significant public support for sustainably grown, local seafood. Seven in 10 respondents would eat more seafood caught or raised in the U.S. if fish came from sustainable sources, and if there were higher safety and

environmental standards on how farmed fish are produced.

To grow enthusiasm for domestic seafood farming, EDF co-founded the Coalition for Sustainable Aquaculture, which includes award-winning chefs, environmental nonprofits, industry leaders and others who support science-based and equitable aquaculture in offshore U.S. waters.

“Wild-caught fish alone won’t meet the growing demand,” says Andrew Zimmern, a four-time James Beard Award-winning chef and member of the coalition.

“Growing more sustainable seafood here at home can help. But there are risks, so we have to get it right.”

For people and the planet

In Hawaii, the Alekoko fishpond was built to feed royalty more than a thousand years ago, and is still standing today. For advocates like Brenda Asuncion, a revival of these ancient practices offers a potential to provide livelihoods to coming generations, while preserving our common resources in coastal and offshore waters.

“A lot of conservation is about protecting places from humans,” says Asuncion. “But we learned from our ancestors that in many cases it is the work of humans that helps places to thrive.” ■



An oyster farm in Japan, where protein-rich shellfish have been cultivated for hundreds of years.

THE SHIPPING NEWS

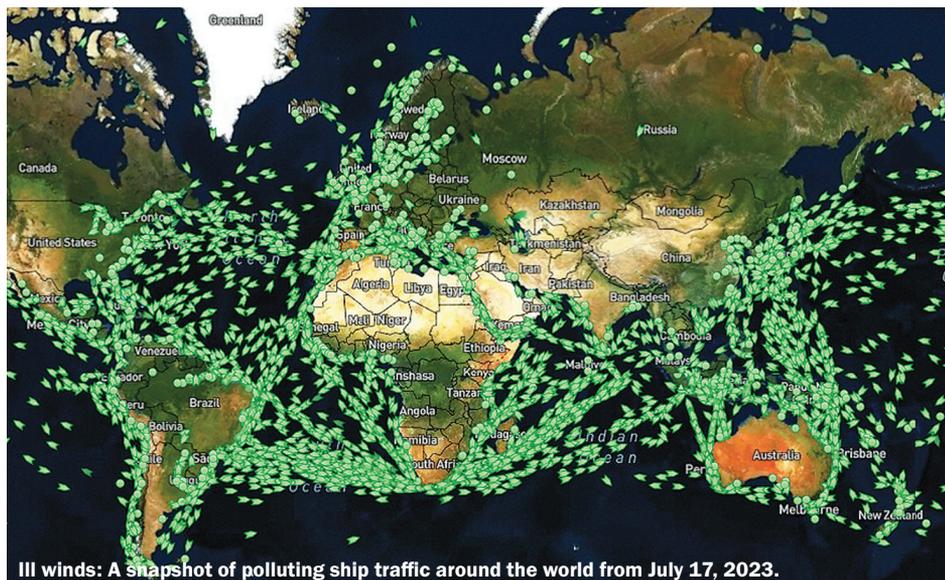
Huge ships that carry everything from steel to sneakers across the oceans run on the world's dirtiest fuel. EDF is working to cut the industry's emissions before it's too late.

By Liz Galst

PICTURE THIS: A SHIP CAPTAIN, WAITING in a harbor after speeding across the ocean, stands on the deck of his giant container ship. He checks his watch. It's a futile gesture, really. The boat is going nowhere. As is common in international shipping, it's been waiting for a berth for two weeks and will likely wait more before finding a place to dock and unload its cargo of sweaters, washing machines and rubber ducks.

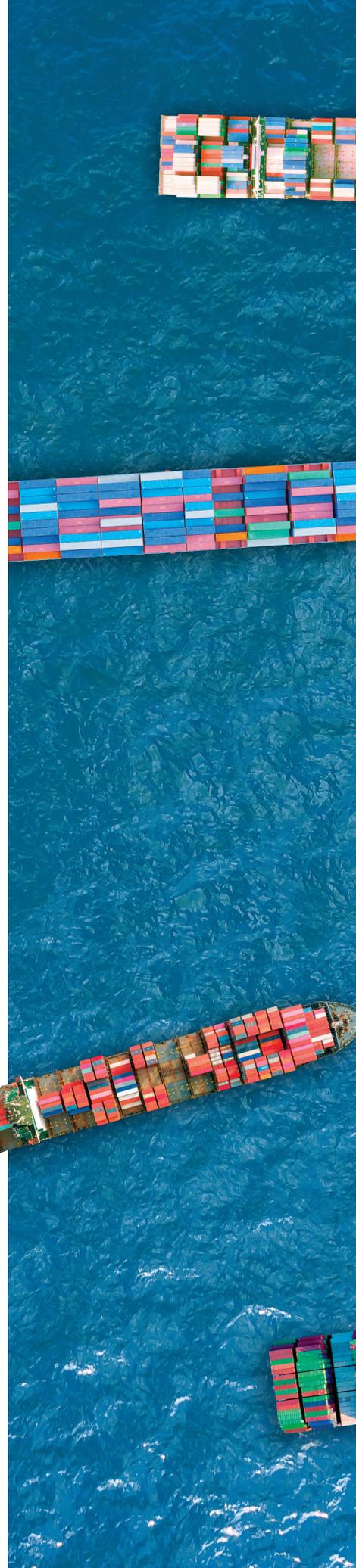
As it idles, the ship continues to spew carbon dioxide and air pollutants like smog-forming nitrogen oxides into the atmosphere, contributing to climate change and serious health problems for people who live and work near ports (*see sidebar, p. 10*). The ship runs on bunker fuel, which is literally the dregs of the oil refining process — the dirtiest of dirty fuels.

Almost 100,000 boats like this move 11 billion tons of goods across the world's



Ill winds: A snapshot of polluting ship traffic around the world from July 17, 2023.

MARINETRAFFIC.COM



oceans each year. If maritime shipping were a country, it would be the world's sixth-largest climate polluter. And as global trade increasingly brings everything from apples, toasters and cement across the seas, climate pollution from shipping is projected to grow.

Historically, the shipping industry has done little to tackle its pollution. While government and industry action has launched cars, trucks and even aviation on paths to reduce their emissions, shipping, which is governed mostly at the international level, has largely remained untouched.

Now, that is finally starting to change.

Governments are beginning to take climate action that can impact how the industry operates. Some of shipping's biggest customers are pushing for change as they seek carbon cuts in their supply chains. And the shipping industry itself has begun experiencing the impacts

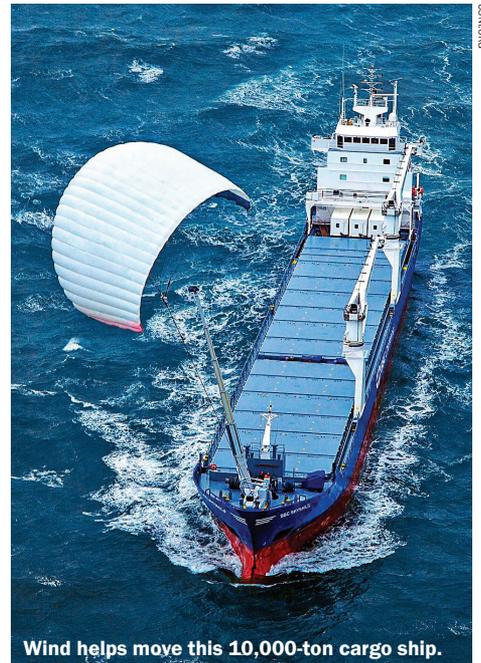
of global warming: Increasingly powerful storms that damage ships and force cargo containers overboard are just one of many ways the industry is feeling the punch.

"The next two years will be crucial," says EDF's London-based Director of Global Shipping Marie Cabbia Hubatova. "There are opportunities to go from one of the dirtiest sectors to one of the cleanest, if we take ambitious action now."

Since 2016, EDF has put its collective shoulder to the wheel to help make this happen. We have used our deep connections in the business world and employed our scientific and policy expertise. In December, the United Nations' International Maritime Organization, the body that governs global shipping, granted EDF consultative status, making our organization one of the few environmental organizations able to observe and provide expert input to IMO discussions, supporting the shipping industry and countries in the effort to propel climate ambition forward.

Full speed ahead?

When compared with other methods of moving commodities and goods around the world, maritime shipping actually has a lot going for it. It's relatively inexpensive, allows companies to move huge masses of stuff — some vessels are more than three football fields long — and emits far fewer



Wind helps move this 10,000-ton cargo ship.

greenhouse gases per unit than any other form of transport.

Still, the industry as a whole has a long way to go. This is true despite a new IMO agreement in July "to peak GHG emissions from international shipping as soon as possible," and, it said, somewhat wishy-washily, "to reach net zero GHG emissions by or around, i.e. close to 2050." (The agreement includes interim targets of at least a 20% emissions reduction by 2030 and at least 70% by 2040.)

To help make that happen, at least 10 major shipping companies have committed to reduce their carbon emissions to zero by 2050 or before. Among them: Maersk, Nippon Yusen Kaisha and Hapag-Lloyd. But they represent only a small fraction of the global industry.

What can make the difference? To begin with, energy-efficiency opportunities can help the industry cut its climate pollution by as much as 50% by 2030, as scientists say every industry must in order to ward off climate change's worst impacts.

These opportunities include better communications technologies and more sophisticated logistics that can reduce the amount of time ships wait in harbor for a berth. While at port, ships can use electricity supplied from the dock, rather than running their engines.

Newly designed propellers pack more punch per unit of energy. And then there's wind: It's making a comeback, with some cargo vessels already sporting new high-tech features that allow them to take

advantage of shipping's oldest form of propulsion.

The industry is also testing new types of fuels. Top contenders include ammonia (a more concentrated form of the household cleaner), a kind of alcohol known as methanol, and hydrogen. Each has pluses and minuses, and is “green” only if produced using renewable energy. Companies such as Man Energy Solutions are putting that effort into action, building ammonia-fueled ship engines, with the first ones expected to go into use early next year.

50%

Energy-efficiency measures can help the industry cut its climate pollution by as much as 50% by 2030.

Source: Bouman, Lindstat et al. (2017)

Some shippers, owners, governments and advocacy groups like EDF are backing an additional solution — a price on the carbon emissions of fuel that could nudge companies in the right direction without significantly increasing the cost of shipping. A carbon-pricing mechanism would not only spur efficiency measures, “the funds could help create a level playing field and close the price gap between conventional and sustainable fuels,” says Sam Yarrow-Wright, EDF’s global shipping policy manager. “They can help cut climate pollution in developing countries, especially less-developed countries and small-island states.”

Pressure from outside

This year, a climate-change-related drought has meant the operators of the Panama Canal have had to reduce the number of trips cargo ships can make through the crossing’s locks. (The canal fills using water from lakes that are highly dependent on rain.) The restrictions have increased prices and slowed the transit of goods and commodities, like U.S. grain, at a time when consumers are still reeling from recent inflation and the war in Ukraine has disrupted grain markets.

As the impacts of global warming grow, it’s not just the IMO that is working to improve maritime shipping’s impact on the climate. As part of its Fit for 55 climate package, the European

Union will require certain large ships in port to use shore power by 2030. It’s also requiring significant cuts in climate pollution from shipping fuels: 31% by 2040, 62% by 2045 and 80% by 2050.

In the U.S., California already requires some large ships to use shore power when docked; the Golden State will increase electrification requirements through 2027. And federal climate legislation passed in the last two years — the Bipartisan Infrastructure Law and the Inflation Reduction Act — together dedicate \$20 billion to reduce climate and air pollution from U.S. ports.

A number of the shipping industry’s customers — including Amazon, Unilever, IKEA, Target and major German retailer Tchibo — have committed to use only zero-emissions cargo ships by 2040 and to advocate for policies that promote climate-pollution-free shipping.

The idea behind this alliance “is to aggregate demand and utilize economies of scale so that scaleable and financially viable zero-emissions solutions can be accelerated,” says Elisabeth Munck af Rosenschöld, an IKEA global sustainability manager. “We strongly believe in the power of collaboration to enable the transformation of the industry.”

More efforts are in the works. Around the globe, governments, shipping companies, policy experts and other stakeholders are collaborating to create so-called green shipping corridors. They are specific trade routes that will make it easy for ships to access climate-friendly options such as low-carbon fuels for refueling and onshore power at docking.

It’s an exciting time in the industry. But much work needs to be done, especially over the next few years, as the IMO hammers out rules that can make or break it — and the world’s — climate goals.

“Shipping and the IMO have an opportunity to shake off a reputation for lethargy,” says Yarrow-Wright. “The shipping industry can go from being a climate laggard to a climate success story. Our ports can be healthier places. These things are already happening. We just need to make sure everyone around the world can and will join in.” ■



POLLUTION AT PORT

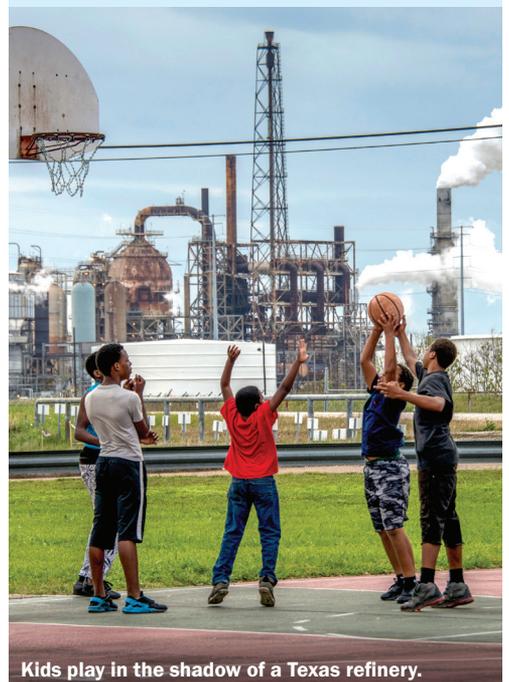
While busy ports keep global trade going and fuel local economies, there’s a downside for people who live near them: pollution.

“Ports are a hub for many freight modes — ships, trucks, trains, big cranes to lift cargo — and all of those run on very dirty fuel,” explains Fern Uennatornwarangoon, a senior air quality policy manager at EDF. “So nearby communities are exposed to multiple harmful sources of air pollution.”

That’s why, alongside our work on international shipping, EDF works in several port cities to help reduce air pollution.

In Houston, the 50-mile Ship Channel that brings ocean-going vessels inland is lined with giant, polluting petrochemical facilities. EDF scientists used two Google Street View cars equipped with air quality monitors to pinpoint exactly where dangerous pollutants like black carbon, nitrogen oxides and fine particles accumulate. This information helps advocates, public health officials and city leaders prioritize where to monitor and reduce pollution.

EDF staff also successfully advocated for Port Houston officials to set the port’s first-ever goal of carbon neutrality by 2050.



Kids play in the shadow of a Texas refinery.

KAREN KASMAUSKI / ILCP

Clearing the air

An all-female team of health workers is helping EDF and partners tackle air pollution in India.



Health activists: ASHAs are counseling 40,000 households on ways to prevent air pollution.

BLACK SMOKE. NOXIOUS FUMES. AN acrid smell so overpowering that neighbors would complain. A small, home-based chocolate maker in Indore, India, was producing a foul smell along with his candy — but no one knew why.

“Many residents complained to me about this, so I tried to visit, but the owner wouldn’t allow us to enter,” says Bhumika Deshraj. Deshraj is an ASHA, or accredited social health activist, part of an all-female team of health workers trained by the Indian government to help communities access the care they need.

Her usual focus includes everything from prenatal care to educating families about hygiene and vaccinations. But in 2023, Deshraj attended a training organized by Clean Air Catalyst, a global coalition that EDF helps lead (*see box*), and learned about another health threat facing many Indian communities: air pollution.

The foul smell in her neighborhood immediately came to mind. “So, I visited that house again,” says Deshraj. This time, she was able to enter because the owner’s wife was pregnant and Deshraj offers prenatal counseling. Once inside, the source of the smell was easily identified. The owners were burning coal and tires to heat the chocolate.

Armed with health data from the training, Deshraj counseled the family on the risks of breathing in the toxins released by burning tires and coal.

Because of her outreach, they switched to a cleaner heat source — in this case, liquid petroleum gas.

According to the World Health Organization, billions of people cook over open fires indoors or inefficient stoves fueled by wood, animal dung or coal — all of which generate harmful pollution. That indoor air pollution kills more than 3 million people every year. And because women still do most of the cooking in many places, they are disproportionately affected by the health harms, which include heart disease, stroke and lung cancer.

WHAT IS CLEAN AIR CATALYST ?

Clean Air Catalyst is a global partnership launched in 2020 with the support of the U.S. Agency for International Development and is led by World Resources Institute and EDF. Catalyst partners focus on locally tailored solutions to curb air pollution, tackle climate change and improve people’s health.

Still, many ASHA health workers said that the Clean Air Catalyst training was the first time they had learned about the hazards of indoor air pollution.

“I was not aware that air pollution is one of the causes of heart attack and also was not aware that women are more vulnerable than men,” Deshraj says.

Sheetal Chand Rawat, another ASHA worker in Indore, agreed. “Before the training, I didn’t know that air pollution

affects pregnant ladies and their unborn child,” she says. “I learned it can be a cause of low birth weight and many more ailments.”

Knowledge is power

Today, Deshraj and the 40 other health workers who attended the training are using what they learned about indoor air pollution to encourage their neighbors to switch to cleaner cooking fuel and avoid other polluting activities such as burning household garbage. Given that each ASHA is responsible for counseling about 1,000 households, some 40,000 households will benefit.

Recognizing their contribution, Indore Mayor Pushyamitra Bhargav said, “It is with the help of ASHAs, not only in Indore, but all over our state, that we have been able to implement so many new community welfare programs. It is significant that these [women] have learned to make the public aware about clean air.”

Of course, convincing individuals to change their habits won’t solve all of India’s air pollution problems. So Clean Air Catalyst leaders are also working with government officials to enact pollution-control measures at scale.

The first step in convincing those leaders to cut pollution? Data.

“EDF is helping to lead the scientific research in Indore,” says Megha Namdeo, an engagement manager for Clean Air Catalyst. “They are doing air quality monitoring and gathering the data that decision-makers need to clean up Indore’s air.”

Scientists from Clean Air Catalyst also carried out Indore’s first-ever emissions inventory and are now determining how much different sources — from transportation to industry — contribute to Indore’s overall pollution. The goal is to complement India’s National Clean Air Program and facilitate policy recommendations for the region’s regulators.

Kaushik Hazarika, an EDF advisor and project manager for Clean Air Catalyst, says he hopes the work in Indore, which is a five-year pilot project, will create a replicable model for cities across India — and the world.

“We hope that our outreach will spread awareness about air pollution — both the problems it causes and potential solutions,” he says.

Vanessa Glavinskas

The global hunt for a hidden climate threat

Methane is speeding up climate change — but to stop it, we first need to find it.

By Vanessa Glavinskas and Shanti Menon

OVER THE PAST FEW MONTHS, THE WORLD has broken some terrifying records. Not only did scientists mark three of the hottest days ever recorded, one right after the other, but ocean temperatures also soared to new highs.

The climate is in crisis, and we need solutions, fast. That's why EDF has mounted a global campaign to reduce methane pollution. Methane is a short-lived but powerful greenhouse gas that is accelerating climate change. To stabilize the climate, we need to act fast to reduce both long-acting carbon dioxide pollution and short-lived methane.

But to cut methane, we need to be able to locate and measure emissions. This is no easy task. There are millions of potential methane pollution sources all over the world, including oil and gas equipment and operations, livestock and landfills. Emissions can be large or small. They can last months or minutes. They're invisible and disperse with the wind.

Perhaps it's not surprising that the world has lacked an accurate picture of methane emissions. But that's changing.

Over the past decade, EDF scientists and partners have been working around the world deploying methane-detection sensors on everything from cars to cell phone towers to planes. This summer, EDF led a team of researchers in outfitting a Lear jet solely dedicated to methane detection and measurement. And next year, EDF subsidiary MethaneSAT will launch a groundbreaking satellite that will locate and measure methane emissions across the globe, and track how they are changing over time.

Data from these and other new efforts to detect methane will give the world an unprecedented understanding of methane emissions and guide action to make sure reductions happen quickly.

Here's how we're closing in on methane. ▶

SATELLITE

COVERAGE: global



RESEARCH JET

COVERAGE: regional



DRONES, HELICOPTERS, PROP PLANES

COVERAGE: local hot spots



In Mexico, sensors on small planes revealed that methane leaking from a single facility equaled half the gas used by all of the country's residential customers.

CARS AND CAMERAS

COVERAGE: close up



In 2024, EDF subsidiary **MethaneSAT** will launch a satellite to locate and measure methane leaks large and small, with a precision, speed and scale that's never been possible. Using groundbreaking technology, MethaneSAT can detect changes as small as 3 parts per billion of methane in the atmosphere. MethaneSAT data will be available at no cost to companies, governments and the public to speed up emissions cuts and track progress.



Developed by scientists from EDF, Harvard and the Smithsonian Astrophysical Observatory, **MethaneAIR** uses the same methane-detection technology behind MethaneSAT, installed in a modified Lear 35 jet. MethaneAIR is currently measuring methane emissions from major oil and gas producing regions across the U.S. and Canada, providing the most comprehensive look at this pollution to date. (Emissions from the aircraft itself will be offset.) MethaneAIR is also measuring emissions from nearby landfills and agricultural sources.

Drones, helicopters and propeller planes can help locate and measure methane pollution at known trouble spots. European satellite data shows the EU's biggest methane hotspot lies above a coal mining region in Poland. This year, EDF scientists, as part of a UN-led initiative, went in for a closer look. Using a sensor pod towed by a helicopter, along with other instruments, the team was able to measure coal mine methane emissions with unprecedented accuracy. The data will help guide ongoing EU efforts to cut emissions.



To measure and verify emissions up close, researchers in oil fields and cities around the world use methane-detection equipment mounted on cars or vans. EDF's partners at Seoul National University in South Korea (*far left*) drove through the streets of Seoul to determine where and how much methane was escaping from the city's natural gas pipelines. In oilfields or near oil and gas facilities, special, handheld infrared cameras can "see" plumes of methane to help identify and fix leaks.

PHOTO ILLUSTRATION BY TINK TANK STUDIO WITH IMAGES FROM METHANESAT, NICK WAGNER, EDF CHINA OFFICE, UNSPLASH AND FREEICONS.PNG.COM

Shopping online? Try this

Five ways to make your order greener.

THE WINTER GIFT-GIVING SEASON WILL BE HERE ANY MINUTE. IF YOU'RE anything like the average consumer, you'll be doing a lot of your shopping online. That means you or your loved ones will get lots of packages delivered by fossil fuel-burning vehicles.

Not only is this bad for the planet, it's also devastating to communities located near e-commerce warehouses and distribution centers. Those neighborhoods bear the brunt of delivery truck pollution, which is linked to high rates of asthma and other illnesses.

The good news is you can make a difference. If you're buying online, here are some simple steps that can help.



1 Think twice, ship once

Research shows we are up to three times more likely to return products we buy online compared to products we buy in stores. More returns means more truck trips and packaging, which means more pollution. So before you click "Order," make sure you're shopping for keeps.

2 Wait for it

Choosing next-day delivery ups the likelihood that your package will arrive on a truck that's only partially full. Using slower delivery options — and saving multiple purchases for a single order — means companies can consolidate loads and routes, making for fewer trucks on the road and less pollution overall.

3 Reuse, repurpose, recycle

Give new life to all that packaging. Boxes can be used again and again. (They're popular on Buy Nothing groups — local, online communities where people give stuff away and get stuff for free). Boxes can also be turned into furniture, kids' forts, you name it. And you can always recycle them. Many a local UPS store or Mail Boxes Etc. will happily accept your bubble wrap and packing peanuts.

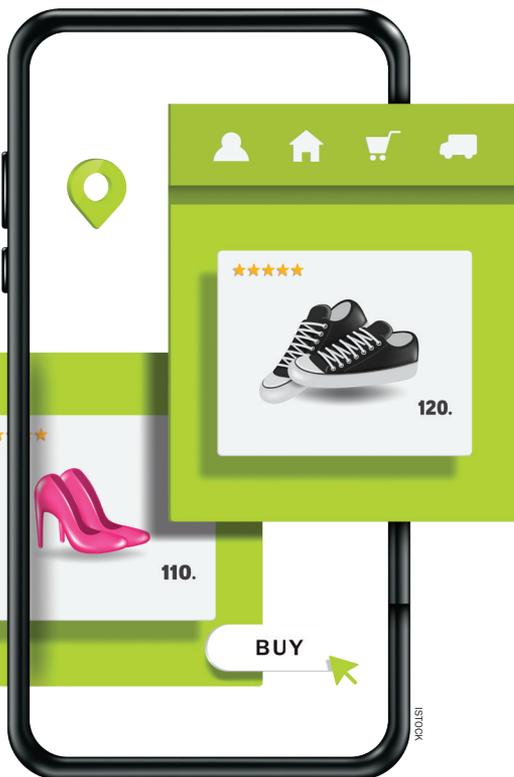
4 Be cautious with "carbon-neutral"

Some e-retailers offer consumers the option to pay to offset pollution related to their purchases. But it's important to do your research to be sure your money is going to a credible program that will create the climate and social impact you want it to. (For example, some forest preservation programs risk displacing deforestation from one place to another). EDF is working through the Carbon Credit Quality Initiative to build awareness and provide educational tools to help carbon credit programs and companies ensure their credits genuinely reduce greenhouse gas emissions, while benefitting Indigenous Peoples and local communities.

5 Join hands

You shouldn't have to make online shopping better all on your own. And you're not. By being a member of EDF, you're helping us collaborate with companies to cut climate pollution and with regulators to set smart pollution limits for trucks. There's more you can do, too. Let companies know you want more sustainable options by writing a letter, creating a petition or running a public campaign. Your voice can make internet shopping better for everyone.

Liz Galst



TAKE ACTION. Join EDF in supporting the Environmental Protection Agency's plan to reduce dangerous pollution from new freight trucks.

★ YOU GOT THIS DONE!

Bringing solar home



Mason Rolph (blue shirt, center) celebrates with Olympia Community Solar board and staff.

AS PRESIDENT OF THE NONPROFIT Olympia Community Solar, EDF member Mason Rolph had a successful track record of developing large-scale solar projects in Olympia, Washington. But in the course of his work, Rolph heard increasingly from people in his hometown who wanted to bring rooftop solar to their own houses, but were stymied by the cost and complexity.

“We didn’t have a focus on individual projects,” says Rolph. “But the need was there, so we wanted to find a way to

support them. The question was, how to turn an individual choice into a supported community effort?”

After investigating various models for community-based group purchasing programs, Rolph and his team decided to organize a Solarize campaign. Solarize campaigns are locally organized community outreach efforts that leverage group-purchasing power to allow customers to buy photovoltaic systems from vetted installers, for significantly less money than the typical market rate.

When the campaign launched in 2021, Rolph says, he was overcome with doubt. “Would there be enough interest from the community? From the installers? And would we be able to secure funding to help us do it all?”

As it turned out, the program’s combination of group discounts, experienced installers and inclusion in an eco-conscious community unleashed Olympia’s pent-up demand for solar.

“There was so much interest that we had to close the signup portal a month early,” says Rolph. “Within a few weeks, we contracted 131 systems. And a lot of people who expressed interest that first year were able to sign up in later years.”

Going into its third year, the program has installed more than 250 rooftop systems and expanded into four nearby counties, creating a community of homeowners as well as a platform for solar education.

“I can recognize our projects when I’m driving around town, a solar nerd looking at rooftops,” says Rolph. “Seeing them is super-heartening, because with each one the effect ripples out through the community. The energy continues to build.”

Tom Clynes

TAKE ACTION Start a Solarize campaign in your community at solarcrowdsource.com.



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