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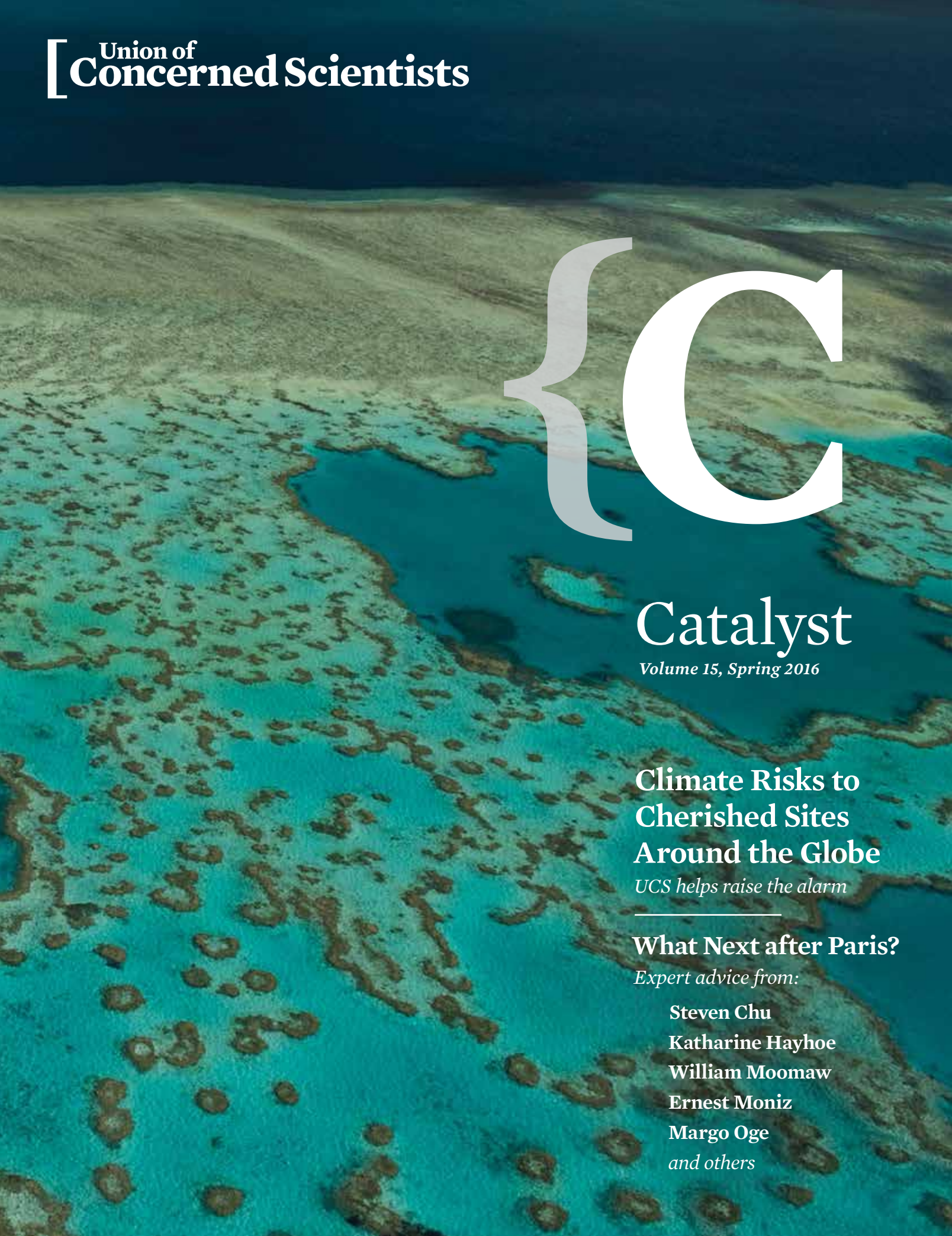

Catalyst

Volume 15, Spring 2016

Climate Risks to Cherished Sites Around the Globe

UCS helps raise the alarm

What Next after Paris?

Expert advice from:

Steven Chu
Katharine Hayhoe
William Moomaw
Ernest Moniz
Margo Oge
and others

Union of Concerned Scientists

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The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with citizens across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

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ON THE COVER: *Australia's Great Barrier Reef, where coral is dying from ocean acidification caused by elevated levels of carbon dioxide in the atmosphere.*

Taking Science to the Courtroom

By Ken Kimmell

The Union of Concerned Scientists does not usually participate in legal disputes. But given our organization's leadership role in advocating for and strengthening the Environmental Protection Agency's Clean Power Plan, and our strong presence in the Paris climate negotiations, we felt a special responsibility to engage in a court case of great consequence that is now under way. This month, UCS filed an *amicus curiae* (friend of the court) brief with the Court of Appeals to defend against a legal challenge to the Clean Power Plan. In this case, fossil fuel companies and a number of states are trying to undo the nation's first regulation to cut carbon pollution from power plants, and the case is likely to be ultimately resolved by the Supreme Court.

You won't be surprised to hear that our brief focuses on science. It marshals the best scientific evidence to show that it is a monumental task to achieve the Paris goal of staying well below a 2°C temperature increase. A delay in cutting emissions from power plants—the largest source of heat-trapping gases in the United States—may make meeting this target all but impossible. We also explain that the Paris agreement depended on US leadership, so sending the Clean Power Plan back to the drawing board could cause other countries to back off their own pledges—and leave the Paris agreement stuck at the starting gate.

> ***A new UCS legal brief defends the Clean Power Plan for its role in combating climate change and helping to fulfill the US pledge in Paris.***

As a former litigator, I know that judges do not decide legal issues in a vacuum; they think hard about the practical consequences of their rulings. Our *amicus* brief will leave the court with no uncertainty about the grave implications of a decision that sides with the carbon polluters to strike down the Clean Power Plan. {C}

***Ken Kimmell** is president of UCS.*

Photos: UpstateNYer/Creative Commons (Wikimedia) (courthouse); © Richard Howard (Kenneth Kimmell)

We asked: What would you recommend to speed the widespread adoption of electric vehicles?

WHAT OUR MEMBERS ARE SAYING

I recommend an increase in the rebates for these vehicles. A lower purchase price would encourage people to buy these cars. Also, lower utility rates for those who own such vehicles.

Richard Solomon, Oakland, CA

I drive a Chevrolet Volt. It has all of the major advantages of an electric car with the additional advantage of an efficient gas engine that kicks in if you run out of electric range (currently about 53 miles, which is about what the average driver uses in a day). Drivability is excellent. What is needed is more marketing, but automakers seem to lack any interest in such a campaign. With better marketing, I cannot imagine why anyone would want to drive a car without this technology.

Benjamin Wiener, Carpinteria, CA

Increasing renewable sources of electricity is critical for making electric vehicles a viable option. It is also critical to support fair net metering that benefits home owners and alternative generators. This supports local solar rooftop and other alternative energy installations and makes paybacks to owners and operators realistic. It also supports the right kind of electric vehicle recharging at home or locally.

Neal Gruber, Madison, WI

More charging stations, especially in rural areas just within range of the city. Also it will just take time to get some electric cars on the used-car market. I have never owned a new car and certainly cannot afford a new electric one.

Rolf Jander, Surrey, British Columbia

We need government subsidies to utilities to install and maintain conveniently located charging stations. Utilities could in turn collect highway taxes on their charging fees, which would offset the lost revenue from gasoline taxes. We also need subsidies to automakers to keep the cost of electric vehicles affordable to all, as well as credits to consumers for the purchase of such vehicles.

M. Carroll, Lansing, NY

Folks could rent EVs to "get the experience" and then be more likely to buy. It would also help to have more advertising about the benefits to pocketbooks in the short term, and to the environment long term.

Susan Dodd, Tucson, AZ

Most people won't migrate to a new technology unless they have a financial incentive to do so. We simply need to assign the true cost to each fuel type, including its polluting content. Attach a fee to all dirty fuels, then return the proceeds from that fee to the American public, or apply it to clean fuel research.

Gary Schettl, Jordan, MN

{C

[IN THIS ISSUE]

What's in Your Tank? Not Knowing Can Hurt the Planet

When choosing a new car, you know exactly how many miles it gets to the gallon, which probably factors into your decision. This information is available thanks to federal fuel economy standards that are intended to hold manufacturers accountable for producing more fuel-efficient vehicles each year. But when you take your new car to the gas station, it's a different story: there's no way to know what harmful emissions were produced to extract and refine the fuel going into your tank.

The sad truth is, while fuel economy standards have helped gas-powered cars run more efficiently, the gas these cars run on is actually getting dirtier. The pollution associated with extracting and refining oil has increased by nearly a third over the last decade as companies have increasingly begun to extract it from unconventional sources such as tar sands and shale formations. Unlike the window stickers on cars, however, there is no obligation for companies to publicize the origin of the gas we buy or the global warming emissions caused by its production.

Last year, California and Oregon passed legislation requiring transportation fuel producers to steadily lower the carbon intensity of their fuels—reducing emissions not only from tailpipes, but also from the fuels' production and distribution. A bill proposed in Massachusetts that was recently voted out of committee would require producers and distributors to track the source of all transportation fuels sold in the state. If this bill passes, Massachusetts could set a precedent for this kind of disclosure, holding oil producers more accountable for the emissions their products generate.

Cutting oil use with more efficient cars and cleaner fuels is a critical part of the Union of Concerned Scientists' plan to cut projected US oil use in half by 2035. But we also need to ensure that the oil we do use doesn't get dirtier than it already is. Learn more about the changing composition of oil—and what we need to do about it—in our report *Fueling a Clean Transportation Future,* online at *www.ucsusa.org/FuelingaCleanFuture*.

Extracting oil from unconventional sources such as tar sands is more energy-intensive, generating more global warming emissions compared with traditional oil wells.

In Louisville, Kentucky, community-run Fresh Stop Markets provide local, healthy produce at an affordable cost to low-income neighborhoods.

Cities Fight a Broken Food System

UCS is hard at work with our partners making the case for a national food plan that can address systemic problems in the way food is produced and consumed in the United States. But, in our recent report *Fixing Food: Fresh Solutions from Five U.S. Cities*, we showcase five local efforts that are already addressing some of the worst problems with creative strategies that improve the way we grow, distribute, and consume food.

Baltimore's Virtual Supermarket Program, for example, addresses the lack of access to healthy food in impoverished neighborhoods by letting residents order groceries online and pick them up at the closest library. In Louisville, Kentucky, Fresh Stop Market is increasing the affordability and accessibility of healthy foods through a program its founder, Karyn Moskowitz, describes as "a cross between a fruit-and-vegetable flash mob and a family reunion."

And in Memphis, Tennessee, the Farm Academy, run by the nonprofit urban farm Roots Memphis, provides training in sustainable agriculture and business management to aspiring farmers who sell their produce to local restaurants or through community-supported agriculture (CSA) programs. In so doing, this initiative addresses three problems simultaneously: stemming the decline in small farms; boosting the availability of fresh, locally grown produce; and supporting sustainable farming practices.

Many of the efforts we highlight are scalable, smart solutions for the worst of our food problems. Find the full report—and perhaps some inspiration for your own city—at *www.ucsusa.org/fixingfood*.

Photo: © James Bennett

We Heard You: Now Less Mail, More Reporting on the Work

When we recently surveyed you, our members, about your preferences, one theme came up repeatedly: you wished to receive less paper mail from us. We listened. And because UCS is a science-based organization, we also ran some tests and conducted some analysis about the best way forward.

We have expanded *Catalyst* and will, of course, continue to update members on all our work. But, starting this year, members will receive fewer fundraising letters from UCS: just one per quarter. We're breaking with most other nonprofit organizations' strategies on this, but we have crunched the numbers and concluded that our extraordinarily engaged members will maintain—and even increase—the level of funding necessary to support our scientists and analysts' work. That makes this change a win-win-win: honoring your preferences, funding our mission, and keeping you informed about UCS with less environmental impact. Thank you for your comments and suggestions, and keep them coming!

Photos: Jennifer Grant, Pembina Institute/Creative Commons (Flickr) (tar sands); Suncor Energy/Creative Commons (Flickr) (hands)

Solar and Wind Energy's Future Looks Brighter than Ever

The latest figures on the burgeoning number of new wind and solar installations are exceeding all expectations. Consider: For the first time ever, utility-scale solar projects will add more new capacity to the nation's grid than any other energy source in 2016, according to the US Energy Information Administration. All told, in the United States, more electricity was generated by new solar projects in 2015 than in any previous year according to the Solar Energy Industries Association, and the amount is expected to double next year—with projects now scheduled for 2016 that are expected to generate about 16 gigawatts (GW) of new energy. That's enough to power more than 3 million average homes.

The numbers for new wind power installations are equally impressive. The American Wind Energy Association (AWEA) reports that the United States added almost 8.6 GW of wind energy last year, bringing our nation's total to 74.4 GW—enough to meet the electricity needs of some 20 million American households. And AWEA says another 9.4 GW of wind power is now under construction. Here again, the pace of change is eye-opening: more megawatts of wind power were installed during the fourth quarter of 2015 alone than in all of 2014.

Equally important, though, is the fact that these capacity numbers tell only a piece of a bigger story. Dramatically dropping costs, the extension of the federal tax credit, and farsighted state policies such as strengthened renewable electricity standards all mean the rapid growth in renewables is likely to continue—and UCS is working in states across the country to help make it happen.

In the forecast: improved public health from the resulting reduction in pollution from fossil fuel–fired electricity generation, and economic growth—with lots of new well-paying jobs. The US solar industry, for instance, now employs more than 200,000 workers according to the Solar Foundation—a number that has grown roughly 20 percent since November 2014. And, in another notable indicator, the Bureau of Labor Statistics recently reported that "wind turbine technician" is now the fastest-growing profession in the nation, with employment opportunities projected to double by 2024.

16 GIGAWATTS
of new energy from US solar projects planned for 2016

9.4 GIGAWATTS
of new energy from US wind power installations now under construction

Photo: © iStockphoto.com/EllysaHo

UCS Database Marks 10 Years of Tracking Satellites

Everything from long-distance phone calls to GPS tracking relies on satellites, but most of us know remarkably little about them—such as: how many active satellites are currently orbiting Earth? How many countries have their own satellites? Or, how many of the satellites are used for military versus commercial purposes? Ten years ago this March, we built the Web-based UCS Satellite Database to provide answers to all those answers and more.

"UCS launched the database back in 2006, and it quickly became a favorite research tool for professionals and hobbyists alike," explains Laura Grego, a senior scientist in the UCS Global Security Program. "Astronomers naturally like to look at the planets and stars, but there's a lot that can be learned about military and commercial activity by tracking the objects we humans have placed in space."

The UCS database lists active satellites—ranging from softball-size to as large as six feet by 15 feet—by launch date, country of origin, sponsor, and orbital coordinates. As for some of the questions posed above? There are currently 1,381 active satellites, up from approximately 800 when UCS started the database. Roughly 40 percent are owned by the US government or US corporations, and nearly half of those serve a commercial purpose. To find out more, visit *www.ucsusa.org/satellite_database*.

Pressure Builds on Fossil Fuel Companies over Climate Deception

As the world's major fossil fuel producers begin to hold their annual shareholder meetings this spring, most face growing scrutiny about the discrepancy between their internal understanding of climate science and their public denial of climate change. Last July, UCS released *The Climate Deception Dossiers*, a report documenting how, over the past three decades, many of the world's largest fossil fuel companies have intentionally spread disinformation about climate science.

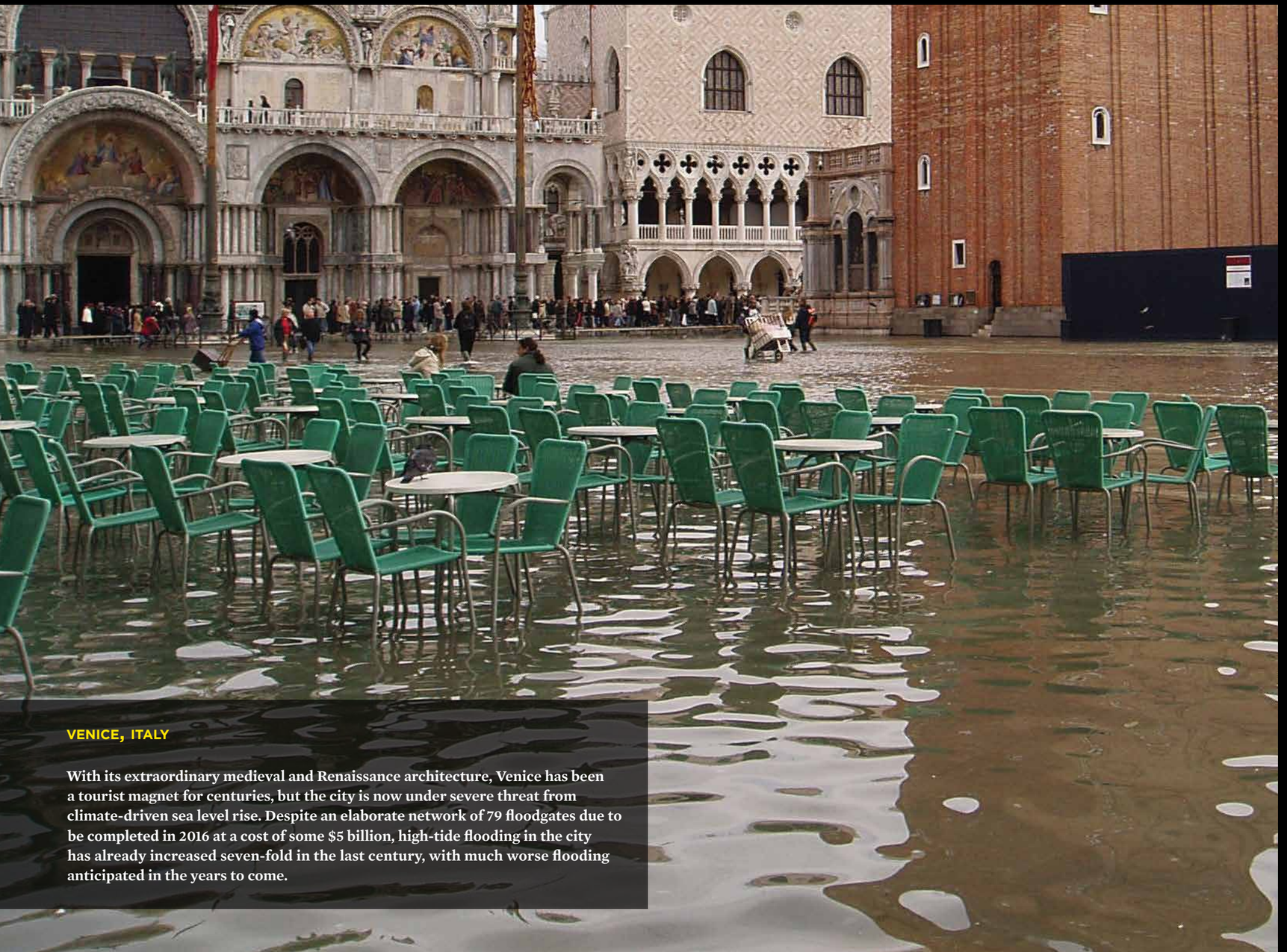
Since the report's release, and subsequent articles in the *Los Angeles Times* and *InsideClimate News*, New York Attorney General Eric Schneiderman, California Attorney General Kamala Harris, and, most recently, Massachusetts Attorney General Maura Healey have all announced investigations into whether ExxonMobil lied to shareholders and the public about the risks of climate change, and whether such actions could amount to securities fraud or violations of environmental laws. According to press reports, the US Justice Department has now asked the Federal Bureau of Investigation to determine whether a federal probe of ExxonMobil's climate disclosures is merited.

In another recent development, Representatives Ted Lieu of California, Matt Cartwright of Pennsylvania, and Peter Welch of Vermont asked the Securities and Exchange Commission to investigate whether Shell Oil violated securities laws by allegedly failing to disclose risks tied to climate change. UCS, meanwhile, is not only working on a report that will rate the climate statements and actions of the major fossil fuel producers, but also partnering with several shareholder groups who plan to call on major producers such as ExxonMobil to explain how these companies are positioning themselves for an increasingly carbon-constrained world.

Massachusetts Attorney General Maura Healey

Photos: Chris Devers/Creative Commons (Flickr) (satellites); © Robin Lubbock/WBUR (Maura Healey)

CHERISHED SITES AT RISK AROUND THE GLOBE



VENICE, ITALY

With its extraordinary medieval and Renaissance architecture, Venice has been a tourist magnet for centuries, but the city is now under severe threat from climate-driven sea level rise. Despite an elaborate network of 79 floodgates due to be completed in 2016 at a cost of some $5 billion, high-tide flooding in the city has already increased seven-fold in the last century, with much worse flooding anticipated in the years to come.

UCS teams up with the United Nations to assess climate threats to key World Heritage sites

BY SETH SHULMAN

The Union of Concerned Scientists broke new ground with its 2014 report *National Landmarks at Risk*. Focusing on imminent climate threats to iconic American destinations such as the Statue of Liberty and Mesa Verde National Park, the report forcefully brought home a message that the effects of climate change are already occurring—endangering beloved pieces of America's natural and cultural heritage. Picked up widely by the media, including coverage on network television's nightly news, the report helped transcend the partisan divide over climate change because the undeniable impacts it chronicled were occurring at places cherished by all Americans regardless of their political affiliation.

National Landmarks at Risk started a conversation in the United States and abroad that has spurred action in some surprising circles. Most recently, UCS was approached by UNESCO—the United Nations Educational, Scientific and Cultural Organization—to partner on a new report looking at climate threats to World Heritage sites around the globe. Forthcoming later this spring, the report will be a joint production of UCS, UNESCO, the United Nations Environment Programme (UNEP), and the International Union for the Conservation of Nature (IUCN).

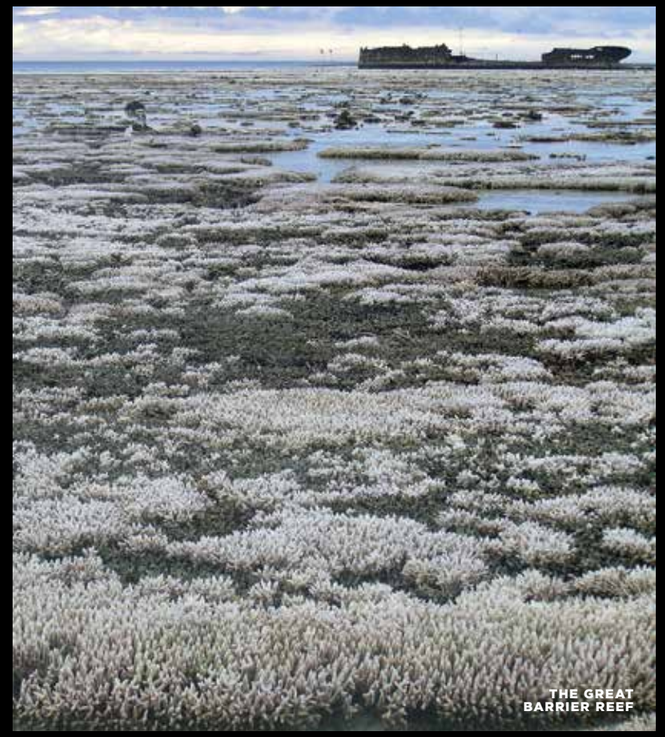
UNESCO began designating World Heritage sites in 1972 to recognize and protect natural and cultural properties around the globe deemed to hold "outstanding universal value." The buildings, wilderness, and historic ruins listed in virtually every nation confer recognition, prestige, and often tourist income for some of the globe's most distinctive places, from the Taj Mahal to the Great Barrier Reef. Now, many of these places (including those pictured here) face unprecedented climate-driven challenges.

"One of the important messages of this work is that the effects of climate change are all around us, affecting not just places we know and care about, but the whole fabric of our cultural heritage that goes along with that," says Adam Markham, deputy director of the UCS Climate and Energy Program and head of the UCS climate impacts team (see the sidebar, p. 11). "Many climate scientists are so focused on the natural threats we face that they tend to overlook the very real threat to cultural resources. By focusing on World Heritage sites in partnership with UNESCO, we're able to collaborate with a whole new set of players."

Photo: Wolfgang Moroder/Creative Commons (Wikimedia)


KIVALINA, ALASKA


TASMANIAN WILDERNESS


THE GREAT BARRIER REEF


GULLAH-GEECHEE NATION, SOUTHEAST UNITED STATES

Photos: © Suzanne Tennant (Kivalina, Alaska); Oregon State University/Creative Commons (Flickr) (Great Barrier Reef); © Dan Broun (Tasmanian Wilderness); denisbin/Creative Commons (Flickr) (Gullah-Geechee Nation)

KIVALINA, ALASKA

The health and future of thousands of native villagers, their traditional practices, and cultural heritage hangs in the balance as rapid climate change tightens its grip on Alaska. Of the state's 213 native villages, 184 are already experiencing severe problems related to flooding and erosion. Many will almost certainly have to relocate within the next decade, and more than 30 were identified six years ago by the US government as already facing an "imminent threat."

THE GREAT BARRIER REEF

The world's most extensive coral reef ecosystem, covering an area of more than 134,000 square miles, the Great Barrier Reef comprises some 2,500 individual coral reefs of varying size and more than 900 islands ranging from small, sandy cays to large, rugged continental islands that collectively include some of the most spectacular marine biodiversity in the world. Like other coral reefs worldwide, the Great Barrier Reef now faces enormous stress from higher sea temperatures and ocean acidification, which kill coral and therefore threaten the entire ecosystem.

TASMANIAN WILDERNESS

Hotter temperatures and drier conditions driven by climate change led to massive wildfires in early 2016 that burned more than 260,000 acres of northwestern Tasmania. Though some of Tasmania's vegetation, such as eucalyptus, has adapted to wildfires, many of the recent blazes raged through ancient forests—with trees often more than 1,000 years old that have not adapted to fire—killing the trees and their seeds, making natural regeneration all but impossible.

GULLAH-GEECHEE NATION, SOUTHEAST UNITED STATES

Members of the Gullah-Geechee Nation are descendants of African slaves who, living in relative isolation on the coastal islands of Georgia and South Carolina, developed their own unique language and culture. Today they face rapid sea level rise and coastal erosion. UCS has met with members of the community to share information and help develop climate resilience plans. {C}

[STAFF SPOTLIGHT]

Photo: © David Gonzalez (Adam Markham)

Adam Markham: Building Bridges Across Continents

As director of the UCS climate impacts team, Adam Markham has traveled the world from Alaska to Australia, engaging with biologists, indigenous tribal leaders, ranchers, archaeologists, policy makers, historic preservationists, park rangers, and many others.

"Things are noticeably changing," he says. "For a lot of the people I work with, climate change has not been front and center. Now it is moving to the fore in many fields." Specifically, he cites recent collaborations with the National Historic Trust, the National Park Service, and the Society for American Archaeology.

A native of England, Markham has a long track record of working at the nexus of history, conservation, and climate change. Before joining UCS in 2013, he directed the World Wildlife Fund's climate campaign, leading its team at the 1997 United Nations conference where the Kyoto Protocol was adopted. He has testified before the US Senate on climate impacts, and written and edited several books including *A Brief History of Pollution*.

"One of the great pleasures of this project," he says, "is that being affiliated with UCS makes it so easy to work with scientists and other experts around the world. I'm very grateful to UCS supporters for making this work possible—the new partners we've gained through this work all recognize UCS as a leader in this field and it's helping us make real progress."

AMERICA'S POST-PARIS CLIMATE TO-DO LIST

NINE EXPERTS' TOP PRIORITIES FOR A LOW-CARBON FUTURE

The Paris climate agreement of December 2015 was a milestone of truly historic proportions as nearly 200 countries committed to the goal of holding the increase in global average temperature to less than 2°C above preindustrial levels, and to pursue efforts to limit the temperature increase to 1.5°C. However, scientific analysis has shown that the specific commitments made so far by the United States and other countries will likely fall far short of meeting these goals. In other words, we have our work cut out for us.

What exactly do we need to do to live up to the Paris agreement? What should our priorities be? To help envision the road to a low-carbon future, the Union of Concerned Scientists consulted some of the world's leading experts. The nine responses included here present some of the key steps we need to take now. But we at UCS also want to hear from you, our members, about the steps you think are most important—and the ones you're taking now—on the road to a sustainable climate. See the box on p. 17 about how you can join the discussion.

The important message: a low-carbon future is well within our reach at a modest cost.

WILLIAM MOOMAW

ACCELERATE THE SHIFT TO RENEWABLES

William Moomaw is professor of international environmental policy at the Fletcher School of Law and Diplomacy at Tufts University. He was a coordinating lead author of the 2001 Intergovernmental Panel on Climate Change (IPCC) report's chapter on greenhouse gas emissions reduction, and of the IPCC special report on renewable energy in 2010.

A remarkable transformation has begun as the world moves swiftly away from the unsustainable fossil fuel economy of the 19th century into a resilient clean energy economy today. Although much work lies ahead, this transformation is already occurring with strong bipartisan support and business leadership. For example, 53 of the world's largest businesses—including Apple, BMW, Google, Microsoft, and Walmart—have pledged to source 100 percent of the electricity they use from renewable sources. A few firms have already met this goal.

Consider that solar power comprised 32 percent of all new electric generating capacity in the United States last year—a 12-fold increase in the amount of photovoltaic installations since just five years ago. Wind power now generates about 5 percent of our nation's electricity and, in some regions, already costs less than natural gas– and coal-fired generation. Texas alone nearly doubled its wind energy generation between 2009 and 2014.

The important message is that a low-carbon future is well within our reach at a modest cost. The United States has the technology to cut emissions 80 percent by 2050 and, according to a recent study by Energy and Environmental Economics, could achieve these reductions with outlays of around 1 percent of the nation's gross domestic product per year. In addition to a safer climate, moving away from fossil fuels will reduce deaths and disabling health impacts from air pollution, lessen destructive extraction practices, improve America's trade balance, and increase our energy security. Such reductions, coupled with end-use efficiency gains and increases in carbon uptake by our nation's forests and soils, can bring us to an economy free of carbon pollution and a climate that will sustain us.

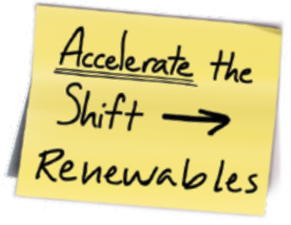
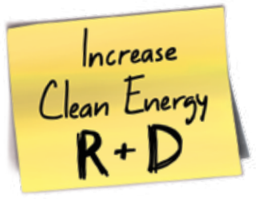


Photo: Global Environment Facility (GEF)/Creative Commons (Flickr)

ERNEST MONIZ
INCREASE CLEAN ENERGY R&D

Ernest Moniz is US secretary of energy and the former Cecil and Ida Green Professor of Physics and Engineering Systems at MIT, where he was a faculty member since 1973. This contribution is excerpted, with his permission, from a speech he gave at the United Nations Environment Programme's Sustainable Innovation Forum in Washington, DC, in December.

At the Department of Energy, where our responsibilities include the majority of US government support for clean energy technology innovation, our theme has been innovation as an enabler for pursuing our climate agenda successfully over many, many time scales. From the short time scale where we need to continue the impressive deployments of clean energy technologies, to the intermediate, to the very long time scale when the kinds of ambition that we are talking about in the context of current commitments will not look nearly ambitious enough as we get to midcentury and beyond, when we are talking not about 25 or 30 percent reductions in greenhouse gas emissions, but about 80 to 100 percent reductions in emissions.



> *A virtuous cycle: innovate, deploy, and reduce costs.*

Our view is that there is a very important kind of virtuous cycle of innovation, of increased deployment, and of cost reduction of these technologies. That paradigm is well established. If I look at just the time period from the Copenhagen conference to [the Paris] conference, we have seen cost reductions of wind, solar, batteries, LEDs that range from 40 to 90 percent. And it's no accident that, certainly in the United States, we have seen deployments increase three-fold for wind, 20-fold for solar, 200-fold for LEDs.

This is the paradigm that I believe we have to sustain. We have to keep working at it. It will be, in my view, a very critical foundation for the kind of increasing ambition that we need to see, year by year and decade by decade.

STEVEN CHU
PUT A GLOBAL PRICE ON CARBON

Steven Chu is a Nobel laureate in physics and former US secretary of energy. He is professor of physics and molecular and cellular biology at Stanford University and a member of the board of Inventys, a carbon capture company. This is excerpted, with his permission, from his op-ed "Making a Fair Deal on Carbon," which appeared in the Boston Globe *on January 15, 2016.*

As we move to make good on the commitments nations made in Paris, global carbon emissions need to be capped below 3.7 trillion tons of carbon dioxide if there is a 50 percent chance of staying below the 2°C target. More than half of this allotment has already been used up since the beginning of the Industrial Revolution and, at our current emissions rate, the remainder will be gone in about 30 years. Clearly, the remaining carbon budget is a precious resource, but cap-and-trade allocations start from existing levels of emissions. It is prima facie unfair to allow developed countries to pollute more because they were historically the biggest polluters.

A global carbon tax avoids the intractable problem of how to allocate carbon emissions credits between developed and developing countries, and levies the highest taxes on the biggest emitters. If countries are unwilling to levy a cost on carbon, the playing field can be leveled with suitable border tariffs on goods imported into participating countries. In addition, the wealthiest countries still need to help less developed countries in this transition.

The most important aspect of a carbon tax that rises inexorably is that it will unleash scientific ingenuity, innovation, and market investments that are still needed to combat climate change. In the last six years, the cost of solar modules plunged to 20 percent of 2008 prices and, in many areas of the world, the life cycle cost of wind and solar energy is dropping below the cost of fossil energy. However, the cost of decarbonizing the first 25 percent of the world economy is far less than the cost of decarbonizing the last 25 percent. A meaningful, and timely, global price on carbon is essential to get us to where we have to be in the coming decades. Otherwise, to quote Martin Luther King Jr., "There is such a thing as being too late."

MARGO OGE
DE-CARBONIZE THE TRANSPORTATION SECTOR

Margo Oge worked for 32 years at the Environmental Protection Agency, most recently as director of the Office of Transportation and Air Quality, where she led President Obama's initiative to halve global warming emissions from light-duty vehicles by 2025. The recipient of presidential awards in the Clinton and Bush administrations, she is currently a distinguished fellow at ClimateWorks and a UCS board member.

We have many tools available to meet the commitments made in the Paris agreement, but none is more important than cleaning up the transportation sector, which currently consumes more of the oil used in the United States than all other sectors combined. When the Environmental Protection Agency set 2025 limits for carbon emissions for cars at half of 2010 levels, automakers were given flexibility on how to reach the target, relying largely on proven technologies available today. Many automakers have developed innovations including more-efficient gas engines and lighter construction materials. Some companies are also investing in plug-in electric vehicles; others are focusing on hybrids or fuel cells. So far, all have met their interim goals and they do not have to invent anything new to meet the 2025 standards. Continuing to strengthen these standards is critical.

Paris should be viewed as a waypoint on a longer-term trajectory. That trajectory will require deployment of new advanced technologies and fuels that propel further reductions into the midcentury. Passenger cars will not only have to go farther on less fuel, but will need to travel more of those miles on cleaner alternative fuels. Federal fuel standards are supporting the use of more advanced and cellulosic biofuels, and states are showing leadership on clean fuels policies.

We will also need new standards to encourage the widespread adoption of low-cost electric vehicles (EVs), with a goal of having these EVs make up 20 percent of new car sales by 2030. We need strong incentives such as tax credits, federal funding for battery research, and government commitments to buy electric and low-emissions vehicles. The next US president will have a big responsibility: to honor the commitments we made in Paris and to reduce the risk of climate change for generations to come. Any successful approach will need to cut oil use, spur innovation, and make steady progress on lower-emissions fuels.

DOUG BOUCHER
PROTECT—AND RESTORE—EARTH'S FORESTS

Doug Boucher is a scientific advisor for, and former director of, the UCS Tropical Forest and Climate Initiative. He has participated in United Nations (UN) climate negotiations since 2007, and used his expertise in the preservation of tropical forests to help shape US and UN policies that curtail global warming emissions.

The historic agreement reached in Paris included provisions that make the land sector—essentially, our planet's forests and farmland—central to how humanity will deal with climate change in the rest of the 21st century. To stabilize the climate, nearly 200 countries in Paris determined that global emissions of heat-trapping gases have to peak and begin dropping as soon as possible.

Critically, the agreement requires emissions to reach a balance with sequestration—the uptake of carbon dioxide from the atmosphere by forests and other vegetation—in the second half of the century. The scientific shorthand for this goal is that we need to reach net zero emissions after 2050. In other words, we'll no longer be contributing to making climate change worse. One essential way to accomplish

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Photos: © Daniel Rosenbaum/The New York Times/Redux (Margo Oge); World Agroforestry Centre (ICRAF)/Creative Commons (Doug Boucher)

this, as outlined in the agreement's Article 5, is by protecting today's forests and, through restoration, creating new ones.

Currently, deforestation is responsible for about 10 percent of the planet's emissions of heat-trapping gases. Not only does that have to end, but we'll also need new growth of forests and other natural ecosystems if we're to reach the long-term goal of balancing emissions with sequestration. Humanity has been destroying Earth's forests for millennia; the Paris agreement means that we've reached a fundamental turning point in that relationship.

ALDEN MEYER
RATCHET UP NATIONS' CLIMATE COMMITMENTS

Alden Meyer is director of strategy and policy at UCS and the organization's principal advocate on national and international climate policy. He has attended the UN climate negotiations since their inception in 1990 and his expertise has helped shape US and UN policies.

The Paris agreement made history with its aggressive goal to hold the increase in the global average temperature to "well below 2 degrees C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees C above pre-industrial levels." But numerous analyses show that the emissions reduction commitments made by more than 190 countries in Paris—while representing a significant improvement over business-as-usual trends—are collectively nowhere near what's needed to meet this goal.

Moving beyond Paris, we need to make sure nations ratchet up their commitments in the years to come. Recognizing the current gap between nations' commitments and the overall global temperature goal, the Paris agreement commissions the IPCC to prepare a special report by 2018 on the implications of the long-term temperature goal. This report will help countries at the climate summit at the end of that year take stock of how their collective efforts match up with the overall emissions reductions needed. Following that summit, countries will be expected to review and, if possible, increase the ambition of their national commitments before formally submitting them in 2020.

> *The rise of renewables shows that a bipartisan consensus on climate action already exists.*

By design, these milestones combine to create a global political moment at the end of this decade, when countries can be pressed to do more. The good news is that, from wind and solar electricity production to super-efficient LED light bulbs, the cost of energy efficiency and renewable energy technologies has been coming down at a breathtaking pace, and these trends are likely to continue. This should enable all countries to significantly increase the ambition of their post-2020 emissions commitments. They will surely need to if we are to successfully address the mounting climate change crisis and leave our children and grandchildren with a habitable planet.

KATHARINE HAYHOE
BUILD ON THE GROUNDSWELL FOR CLIMATE ACTION IN BLUE—AND RED—STATES

Katharine Hayhoe is an atmospheric scientist, an associate professor of political science, and director of the Climate Science Center at Texas Tech University. She served as lead author on key reports for the US Global Change Research Program and the National Academy of Sciences, including the Second and Third US National Climate Assessments, and attended the UN climate negotiations in Paris.

Bipartisan politics in the United States has gone the way of the dodo—and our climate may be one of its greatest casualties. Attacking the basic fact that Earth is warming has become the topic of farcical congressional hearings, the goal of vituperative witch hunts, and the focus of harassment campaigns underwritten by the fossil fuel industry. Bridging this gap in time for meaningful action on climate change would require a miracle.

Here's a radical proposal, though: What if we don't have to agree that humans are the reason the world is warming today? What if we only have to agree that carbon dioxide is bad, clean energy is good, and supporting energy efficiency benefits us all? That would require an even bigger miracle, you may think. But that's not what the public opinion polls show, nor what's in the business news these days.

For three years, new renewable energy has outpaced coal, gas, and oil. From small towns in Texas to some of the biggest corporations in the world, decision makers are choosing renewables: not only for environmental reasons but because it makes "cents" too. A majority in every state supports regulating carbon dioxide as a pollutant—yes, even in the red states. There isn't one congressional district in the country whose constituents wouldn't require their utilities to use clean energy. And across the nation, 44 percent already support a tax (yes, a tax) on carbon.

Who's building this groundswell of support? Conservatives for Clean Energy is campaigning for energy choice, the Green Tea Coalition is fighting for solar energy freedom, the Niskanen Center advocates libertarian principles, the Energy Enterprise Institute pushes free-market solutions, and the grassroots Citizen's Climate Lobby has quietly initiated a genuine bipartisan dialogue already—to name just a few.

The bipartisan consensus on climate action already exists. To make Paris a reality, we just need to tell our elected officials it's here.

WHAT'S ON *YOUR* TO-DO LIST?

We want to hear from you.

Join the discussion by letting us know the steps you think are most important on the road to a sustainable climate—or the steps you, your family, organization, or community are already taking now.

Send your feedback to *catalyst@ucsusa.org.*

And you can learn more about our efforts to fight global warming and sign up to receive action alerts about these efforts at *www.ucsusa.org/action-center.*

PETER FRUMHOFF
STOP FOSSIL FUEL COMPANIES FROM BLOCKING PROGRESS

Peter Frumhoff is director of science and policy at UCS, and chief scientist of the UCS climate campaign. He has published and lectured widely on climate change impacts and climate science policy, and was a lead author of the 2007 IPCC Fourth Assessment Report.

As exposed by UCS and others, the major fossil fuel companies have served as a serious impediment to climate progress over the past several decades by (among other tactics) surreptitiously funding misinformation about climate science in order to confuse the public and maintain the status quo. One of the largest of these companies, ExxonMobil, is now under investigation by the attorneys general in California, Massachusetts, and New York to determine whether it broke the law and committed fraud by concealing climate risks from shareholders and the public.

Fossil fuel companies now generally acknowledge the serious climate risks of their products and some pay lip service to a need for a global price on carbon. But they continue to spend an estimated $700 billion per year to identify and develop new fossil reserves. Simply put, as nations of the world build on their Paris climate commitments, fossil fuel companies face a major choice: will they play a constructive role as we work toward a low-carbon future?

If so, they need—right now—to unequivocally denounce and distance themselves from climate and clean energy disinformation and from the industry-supported trade associations and lobbying groups that continue to disseminate it. They need to build on the generic calls some of them have made for a global price on carbon and actually work toward a strong, specific

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Photo: © Youtube.com/UCS (Peter Frumhoff)

We need to mobilize people to become more active in their local and state governments.

economy-wide carbon price in the United States and other nations. They need to join with other leading corporations that have committed to adopt science-based targets for reducing emissions across their operations and detail these plans for investors and the public. And they need to substantially increase their investments in clean energy technology research and deployment. UCS will continue to work with policy makers, divestment activists, socially responsible investors, scientists, and others in leading the effort to make sure fossil fuel companies stop standing in the way of swift climate progress.

KEN KIMMELL
START CLOSE TO HOME AND SCALE UP

Ken Kimmell is president of UCS, and former commissioner of the Massachusetts Department of Environmental Protection.

Too often, we assume that solving the climate challenge is largely a job for national governments; the Paris agreement itself reinforces this "top-down" view. We need to amend our thinking. While national governments have a critical role to play, success also requires a "bottom-up" strategy that mobilizes people to become active in their communities and through their local and state governments worldwide.

Just look at where most of the policy innovation has come from in the United States and Canada over the last decade: Farsighted people working through state government developed renewable energy standards requiring utilities to purchase growing percentages of clean energy. California, Quebec, and nine eastern states piloted cap-and-trade programs, while decision makers in British Columbia instituted a successful carbon tax. State leadership transcends party and geographic lines. For example, Texas invested billions in transmission lines and now the state is one of the world's largest generators of wind energy.

We see similar leadership at the local level. People working within city government have committed to some of the world's most ambitious climate goals. Stockholm, Sweden, for example, has pledged to be free of fossil fuel emissions by 2040 and has a credible plan to get there. UCS staff members and supporters are working with local governments across the United States because we understand that they control some of the key levers to drive change such as building codes, land use planning, waste disposal, parking, and mass transit. And we're partnering with communities most at risk from climate impacts to develop the locally based solutions they need. Equally exciting, state and local successes are spreading by sharing their stories through coalitions like C40, a network of some of the world's largest cities, and the Under2MOU coalition, a group of states, provinces, and other subnational governments. So, one of the most promising paths forward post-Paris is to nurture innovation at the state and local levels, pioneer bottom-up solutions, and scale up the best of these ideas as rapidly as possible. {C}

PREVENTING AN AMERICAN FUKUSHIMA

Five years since the accident, vital US nuclear safety upgrades lag

BY ELLIOT NEGIN

On March 11, 2011, a 9.0-magnitude earthquake and 50-foot tsunami triggered meltdowns at three of six nuclear reactors at the Fukushima Dai-ichi plant in Japan. It was the one of the worst accidents in the nuclear industry's 60-year history, contaminating thousands of square miles, displacing more than 150,000 people, and likely costing more than $100 billion.

The disaster was a wake-up call for the US Nuclear Regulatory Commission (NRC). After all, nearly a third of the 104 US reactors operating at the time were General Electric Mark I or Mark II reactors, the same as those in Fukushima. The accident raised an obvious question: How vulnerable are those reactors—and the rest of the US fleet for that matter—to similar natural disasters?

The NRC set up a task force to analyze what happened at Fukushima and assess how to make US reactors safer. In July 2011, it offered a dozen recommendations to help safeguard US nuclear plants in the event of a Fukushima-scale accident.

Now, five years later, the NRC has rejected or significantly weakened many of those recommendations and has yet to fully implement the reforms it did adopt, according to a new Union of Concerned Scientists report, *Preventing an American Fukushima* (online at *www.ucsusa.org/AmericanFukushima*). UCS also found that the agency abdicated its responsibility as the nation's nuclear watchdog by allowing the industry to routinely rely on voluntary guidelines that are, by their very nature, unenforceable.

Bags of radioactive soil from the Fukushima site and surrounding areas await transfer to storage facilities that have not yet been constructed.

"Although the NRC and the nuclear industry have devoted considerable resources to address the post-Fukushima task force recommendations, they haven't done all they should to protect the public from a similar disaster," says report author Edwin Lyman, a UCS senior scientist. "If the NRC is serious about protecting the public and plant workers, it should reconsider a number of recommendations it scrapped under pressure from the industry and its supporters in Congress."

HOLDING THE INDUSTRY ACCOUNTABLE

The latest UCS effort to prod the NRC to upgrade its safety standards, *Preventing an American Fukushima* is part of a long-standing and concerted effort by UCS to hold the nuclear industry accountable and educate the press and the public about nuclear safety issues.

Immediately following the Fukushima accident, for example, UCS established itself as a go-to source for independent technical analysis, helping hundreds of reporters understand the unfolding disaster by hosting daily telephone press briefings, issuing press releases, and publishing dozens of blog posts in the weeks following the accident. Many of the reporters covering the story knew little about nuclear power and were extremely grateful. Some even sent emails expressing their appreciation. For example, one veteran Washington reporter wrote, "Your team has been a shining light of sanity since the beginning of the Japan nuclear crisis."

UCS experts—mainly Lyman and Dave Lochbaum, director of the UCS Nuclear Safety Project—were cited in more than 5,500 print, radio, television, and Web stories between March 11 and mid-April, including numerous appearances on ABC, CBS, CNN, C-SPAN, MSNBC, NBC, NPR, and PBS news programs. They also testified at congressional hearings on the accident. Lyman even obtained and released internal NRC documents revealing that some NRC staff members lacked confidence in US nuclear plant safety.

Most important, UCS stuck with the issue even after the initial media interest flagged. In July 2011—the same month the NRC's post-Fukushima task force made its initial recommendations—UCS released its own prescription for strengthening reactor safety. In March 2012, the organization followed up

> *At stake: the health and safety of more than 100 million Americans who live within 50 miles of a nuclear plant.*

with another report, *U.S. Nuclear Power Safety One Year after Fukushima*, and two years later, in February 2014, Lyman, Lochbaum and former Philadelphia Inquirer energy reporter Susan Stranahan published their critically acclaimed book *Fukushima: The Story of a Nuclear Disaster*. The first half of the book offers a definitive account of what went wrong at Fukushima; the second half focuses on what regulators and the industry need to do to avoid a similar disaster here in the United States.

> *The accident raised the obvious question: How vulnerable are US reactors to similar natural disasters?*

Like these previous efforts, the latest UCS report pulls back the curtain on a process that has largely played out behind the scenes. We're working hard to make sure its findings raise some eyebrows—and sound the alarm—on Capitol Hill and in the Obama administration, because public safety depends on federal oversight. We need our elected officials to insist that the NRC reconsider the safety measures it rejected, especially replacing its hodgepodge of vaguely written rules and voluntary guidelines with a rational regulatory approach, and establishing a transparent process that allows the public to assess the effectiveness of its reforms.

Residents living near Fukushima are tested for radioactive contamination.

"The NRC and the nuclear industry have taken steps to address some of the safety vulnerabilities revealed by the Fukushima disaster," says Lyman. "But so far, the agency has failed to fully learn the lessons of Fukushima. It needs to go back to the drawing board and reconsider critical safety recommendations that it dismissed without good justification. And let me stress: This is not an academic exercise. The health and safety of more than 100 million Americans who live within 50 miles of a nuclear plant hang in the balance." {C}

FOUR CRITICAL NUCLEAR SAFETY UPGRADES

The NRC should follow the advice of its own experts.

PROBLEM: ***The NRC ultimately rejected the post-Fukushima task force's top suggestion to overhaul what it called a "patchwork" of regulations and industry-written, voluntary guidelines for "beyond-design-basis" events—incidents that plants were not designed to withstand.***

SOLUTION: The NRC should develop a coherent set of standards that would guard against extreme events like Fukushima and provide a framework for implementing the task force's other recommendations.

PROBLEM: ***The NRC decided to continue to allow plant owners to develop their own voluntary plans for managing a core-melt accident, rejecting a task force recommendation to require plant owners to do so. When plans are voluntary, the NRC has no authority to review them or issue citations when they are deficient.***

SOLUTION: The NRC should require mandatory emergency plans that are rigorously maintained, periodically tested, and subject to NRC inspection and enforcement.

PROBLEM: ***The so-called FLEX program, which is supposed to provide extra backup emergency equipment to cool reactors and spent fuel pools during a prolonged power loss, relies on ambiguously worded, hard-to-enforce directives that allow the industry to set the terms and purchase emergency equipment that may not withstand a severe accident.***

SOLUTION: The NRC must ensure FLEX emergency equipment is robust enough to handle a wide range of contingencies. The agency also should conduct performance-based inspections of the FLEX equipment and the plans to use it.

PROBLEM: ***The NRC staff reversed its recommendation to require owners of General Electric Mark I and Mark II reactors—the same as those at Fukushima—to add filters to "hardened" containment structure vents to avoid releasing radioactive material into the surrounding community. Finland, Germany, Sweden, and Switzerland have such a requirement, and Japan is planning one.***

SOLUTION: The NRC should require owners of GE Mark I and Mark II reactors to install filters on their hardened vents.

Photo: © Associated Press/Kyodo

Photo: © Associated Press

Transparency Isn't a License to Bully

By Michael Halpern

Transparency in government helps us expose inappropriate influence in science and policy making. The public should know who funds a scientist's work, and whether strings are attached to that funding. We should be able to determine whether universities and governments are facilitating independent research or being co-opted by private interests.

Increasingly, however, industries, activists, and politicians of all stripes are subverting the goal of transparency, exploiting divergent state open-records laws and issuing subpoenas that demand exhaustive records of emails, peer review comments, and draft papers from scientists in an effort to manufacture controversy about the scientists' work and, by extension, their field of research. Unfortunately, attacking the scientists who produce a politically inconvenient study can be an effective technique for confusing the public and chilling scientific discourse.

Bankrupt coal producer Alpha Natural Resources recently sued West Virginia University, for instance, to gain access to hundreds of thousands of documents created by a professor who studies the health impacts of mountaintop removal mining. And Texas Representative Lamar Smith, chair of the House Science Committee, recently subpoenaed the emails and draft papers of government climate scientists whose analyses he found irksome.

These actions abuse well-intentioned transparency and accountability laws. Not only do they waste time and resources, they can also delay needed science-based policy decisions, and discourage the candid conversations scientists need to conduct in the course of their research.

> ***UCS is helping to establish norms for transparency that can avoid harassment.***

A SENSIBLE PATH FORWARD

Fortunately, transparency can be achieved without harassment. The Union of Concerned Scientists is leading efforts to better define conflicts of interest and develop common disclosure standards that are fair to all researchers. We also need greater clarity about what constitutes independent science so we have a shared set of rules and so it becomes more difficult for scientific evidence to be misused to justify a particular policy outcome.

Balancing scientific freedom and accountability will protect scientists, improve public understanding of science, and help ensure that government policies are aligned with the public interest. In the meantime, UCS will continue to shine a light on the harassment of scientists and provide them with the tools they need to protect themselves. Learn more at *www.ucsusa.org/scientistsunderscrutiny.* {C}

Michael Halpern *is a program manager for strategy and innovation in the Center for Science and Democracy at the Union of Concerned Scientists. Read more from Michael on our blog,* The Equation, *at* http://blog.ucsusa.org.

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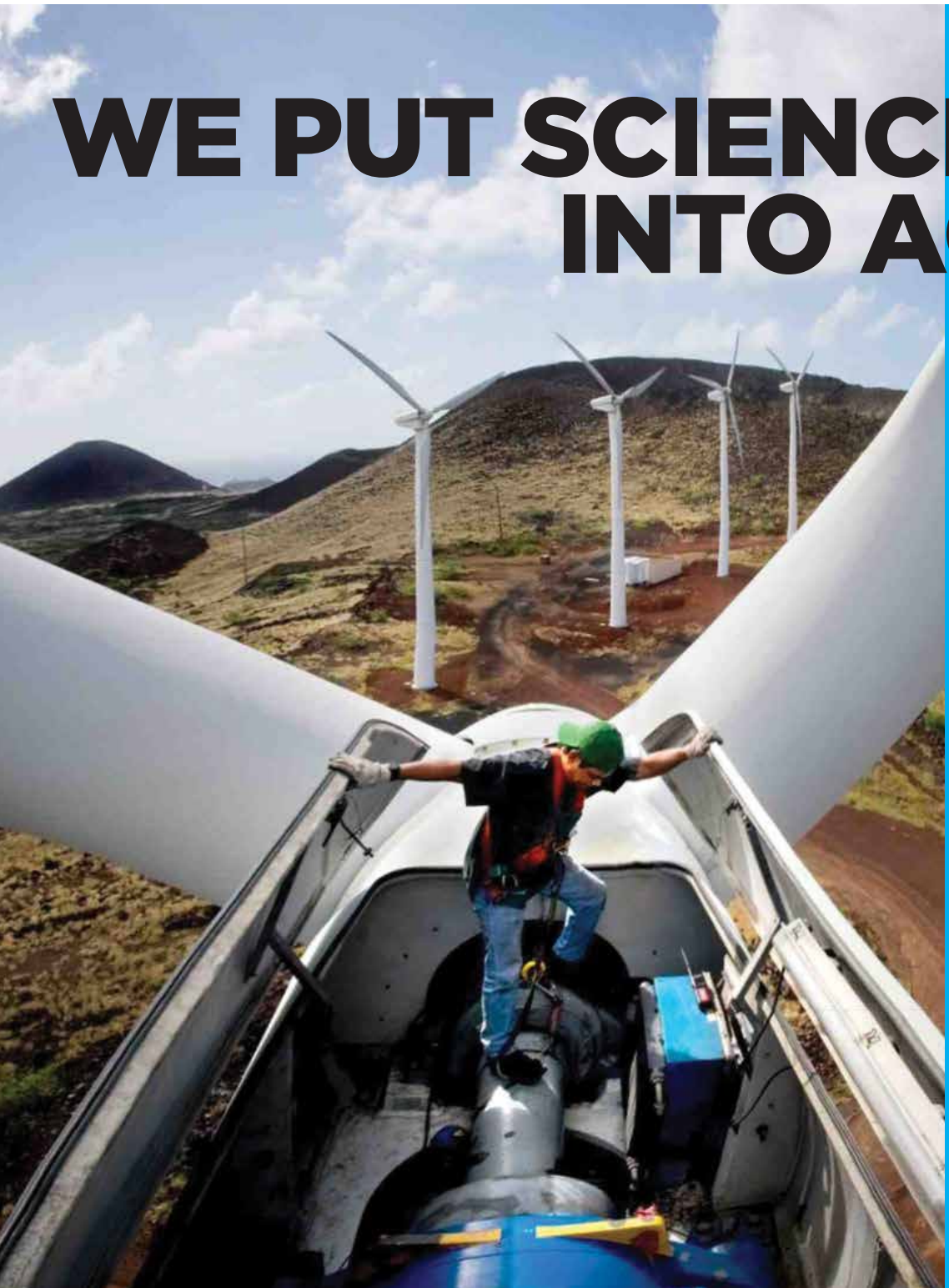

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