



Catalyst

Volume 23, Winter 2023

Combating an Invisible Threat

Tightening protections on ethylene oxide pollution

Making Scientific Integrity Stick

“Danger Season” Teaches Lessons in Climate Resilience

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ON THE COVER:
Protesters in Laredo, Texas, target a local sterilizing facility's emissions of cancer-causing ethylene oxide. See p. 8 to learn more.

The Post-Pandemic World We All Deserve



I have been mulling over this quote from the writer Arundhati Roy for a while:

“Historically, pandemics have forced humans to break with the past and imagine their world anew. [COVID-19] is a portal, a gateway between one world and the next. We can choose to walk through it, dragging the carcasses of our prejudice and hatred, our avarice, our data banks and dead ideas, our dead rivers and smoky skies behind us. Or we can walk through lightly, with little luggage, ready to imagine another world. And ready to fight for it.”

Certainly, we are not yet through the pandemic, nor is our luggage light given the scale of loss around the world, and in our lives. I don't believe Roy is calling for us to forget all of this and sail through the gateway unburdened. Instead, I hear her words as a call to reflect and reprioritize, to leave behind what is no longer serving us, and bring along what we need most.

Like many of us, unfortunately, I've had COVID-19 twice now; I've been extremely lucky to feel no lingering effects. Each time I've emerged from quarantine, I've felt a renewed sense of gratitude for my health and vowed not to take it for granted.

Walking through the portal into 2023 I'm thinking about what to bring into our fight for a new world. The pandemic has renewed my appreciation for the science of public health, how connected our health is to our environment, and how each of us is impacted by public health systems, and the powers that shape them.

COVID-19 has delivered lesson after harsh lesson about the importance of a robust and truly public-serving health system. As I listen to the stories my sister Megan,

(continued on p. 20)

UCS ON THE RECORD . . .

“Rather than responding in a one-off manner to disasters within the U.S., Congress should implement a comprehensive national climate resilience strategy commensurate with the harm and risks we’re already facing.”

RACHEL CLEETUS, policy director in the UCS Climate and Energy Program, in an NPR News story about dealing with climate-related disasters, which totaled \$165 billion in 2022

“Basically, these rains put us on track for average precipitation for this time of the year. There is, of course, a long [way to go] to recover from the previous years of drought. We often don’t see much of that [rain]water going into our streams, rivers, lakes, and reservoirs.”

PABLO ORTIZ, UCS Senior Bilingual Water and Climate Scientist, in a Los Angeles Times story on early 2023 rainstorms in California affecting the state’s drought

“During COP27, we saw a 25% increase in fossil fuel interest direct participation in the meeting; this is a trend we need to move away from for meaningful progress, not embrace through leadership choices.”

L. DELTA MERNER, lead scientist in the UCS Science Hub for Climate Litigation, from an ABC story on an oil executive being appointed to lead the United Nations’ 2023 climate negotiations

. . . AND HAVING AN IMPACT

“Congrats on the great piece in the *Wall Street Journal*. My dad [told me] he finally understood EV charging (notwithstanding me trying to convince him about EVs for the last seven years). Thank you for helping to convert my family to EV true believers!”

KEVIN MILLER, senior director for public policy at ChargePoint

“Thank you for presenting at SACNAS! I was so inspired by your work with UCS, and your shared mission has driven me to start living out my dream now—even before my PhD—to work in science communication and engage in science policy. I look forward to staying connected!”

G. LUND, SACNAS (Society for the Advancement of Chicanos/Hispanics and Native Americans in Science) conference attendee and new UCS Science Network member

“I appreciate UCS’s . . . participation on the [Clean Transportation Investment Plan’s] advisory committee, and your leadership on the equity report of the EV Charging Infrastructure Strike Force. You have gone above and beyond to help guide state investments in zero-emissions vehicle infrastructure and to advance equitable investments.”

PATTY MONAHAN, transportation commissioner at the California Energy Commission



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{ 2022 Science Defenders



Introducing the 2022 Science Defenders

At the end of every year, the Union of Concerned Scientists celebrates a few individuals (and occasionally groups) who have used science in some way to help people and change the world for the better. Last year's four Science Defenders more than meet these criteria. We are pleased to present them.

FIGHTING FOR FOOD JUSTICE

Vanessa García Polanco: As a Dominican immigrant working in US food policy, García Polanco is very aware of how people's perceptions of farmers and food producers differ from reality. "We've created a pervasive and limiting idea of who gets to be a farmer in this country," she says. "And [if we don't change it] every policy is going to be for that person, not for the people who are actually feeding our communities." The co-director of policy campaigns with the nonprofit National

Young Farmers Coalition, García Polanco also maintains weekly conversations on social media using the tag #FoodJusticeFridays.

RECOGNIZING DIVERSITY IN SCIENCE

Dr. Jess Wade: When Wade started her career as a physicist, she noticed that the keynote speakers, award recipients, and celebrated scientists she encountered were predominantly White men—although plenty of accomplished women and people of color contribute to scientific discovery and innovation. Wade resolved to help get those scientists the recognition and opportunities they deserve, and since 2017, has published more than 1,750 Wikipedia pages about women scientists and scientists of color. Thanks in part to Wade and other editors she's trained, more than 75,000

new English-language biographies about women scientists have been added to Wikipedia in the past three years.

BRINGING DATA AND SCIENCE TO THE PEOPLE

Dr. Monica Unsel: As executive director of Until Justice Data Partners, Unsel works to democratize access to science and data for regular people seeking justice—environmental justice, housing justice, or holding powerful people accountable for their abuses. She shares her expertise as a scientist with advanced degrees in biology and public health with her community in Louisville, Kentucky, and beyond. "What's really useful to my community right now are my research skills"—which, she says, shouldn't be withheld by academic institutions. Unsel says she's proudest of normalizing the use of data in her

community to support social justice movements. "Science needs to be what society needs it to be," she says.

INSPIRING GIRLS TO STUDY STEM

Katherine Vergara: While she works on her doctorate in computer science in Santiago, Chile, Vergara also leads a team of female programmers working on a proprietary video game through her independent studio. In her spare time, she's @STEMtivist on Instagram, TikTok, and Twitter, creating short STEM-themed videos that encourage young people—girls and young women especially—to study in these fields. On TikTok, where she has thousands of followers, Vergara provides tips for aspiring scientists. "Information is power," she says. "And we as scientists have this power. It's important for me to give it back to people."

A Historic Commitment on Climate Change, with UCS at the Table



At the United Nations climate conference, UCS President Johanna Chao Kreilick (right) organized and moderated a panel discussion about how local knowledge can supplement science to create change.

A delegation of UCS scientists and staff traveled to Sharm el-Sheikh, Egypt, to attend the United Nations’ annual global climate conference (COP27) last November. In meetings and on panels, we amplified the clear and consistent message shared by Global South activists and representatives: wealthier nations like the United States that have contributed more than their fair share to global warming emissions must commit to financing loss-and-damage funds for extreme climate impacts in vulnerable countries.

UCS pushed our government representatives to make good on the United States’ obligation to cut more emissions, faster, and to provide climate financing for those countries that are paying the heaviest costs in the climate crisis while contributing

to it the least. And for the first time ever, the delegates agreed to establish a fund to pay for loss and damage in climate-vulnerable nations, an important step toward climate justice globally.

During the conference, UCS co-sponsored the Climate Justice Pavilion, a space for climate and

environmental justice activists to meet and share knowledge—hosted for the first time in the “blue zone” area of the conference, in which political leaders from around the world negotiate and make decisions. Visit <https://blog.ucsusa.org/tag/cop27> for an overview of our work in Sharm el-Sheikh.

Writing for the Climate

If you missed the latest in our UCS Conversation Series on “Writing with Impact: How Narrative Inspires Change,” you can still watch the discussion online by visiting www.ucsusa.org/writing-impact-how-narrative-inspires-change. Hundreds of UCS supporters and friends joined our webinar to hear from authors Chantal Bilodeau, Dr. Jessica Hernandez, and Kim Stanley Robinson on how effective and inspiring communicators are essential to building public understanding in the effort to address climate change.

UCS invited these three writers to speak about their work crafting narratives that address the complexity and scope of the climate crisis, and to help us see ourselves as part of the solution. Bilodeau is a playwright, Hernandez writes nonfiction, and Robinson is a science fiction writer; each of them explore our impact on the planet through writing that informs and inspires action. We hope you will enjoy this conversation at the intersection of art and science.

Inside the Modern Electricity Grid



The power grid makes modern life possible—but it’s also holding us back. If we want to solve the climate crisis, we need to modernize the way electricity is generated and distributed. That means understanding and engaging the people and institutions who manage our power system. Watch the video and get involved at <https://cleanupthegrid.org>.



President Biden has been working to bolster science at federal agencies since coming into office. Here, he meets with scientists at the National Institutes of Health shortly after taking office.

In a Major Step, Biden Administration Bolsters Scientific Integrity

Back in 2004, UCS sent a statement to then-President George W. Bush signed by hundreds of the nation’s leading scientists calling on his administration to restore scientific integrity to federal policymaking. Back then, UCS’s use of the term “scientific integrity” was new, encapsulating what had previously been an occasional problem for government scientists, but had become endemic: the politicization of their work. The Bush administration was suppressing and distorting scientific findings to better align with political priorities, preventing scientists from speaking to the media, and choosing members of scientific advisory panels more for their political beliefs than their expertise.

Now, in an important step that caps decades of advocacy by UCS, the Biden administration recently released a landmark scientific integrity framework designed to protect science-based decisions from undue political interference across the federal government.

The 68-page framework offers the first-ever official governmental definition of scientific integrity, which it describes as “the adherence to professional practices, ethical behavior, and the principles of honesty and objectivity when conducting, managing, using the results of, and communicating about science and scientific activities.” It also offers the first-ever model text for federal agencies to draw

upon in crafting scientific integrity policies.

Among the framework’s most notable features is a standing subcommittee on scientific integrity to be housed within the cabinet-level National Science and Technology Council. This group will be comprised of career scientific integrity officials from multiple federal agencies and will help coordinate interagency issues, update scientific integrity policies, and hold senior-level decisionmakers accountable when violations occur.

The new framework also requires federal agencies to monitor a variety of metrics on an ongoing basis to evaluate how well scientific integrity policies are working across

the government. This effort should help establish better consistency across agencies, and help laggards improve and strengthen their programs.

As Jacob Carter, research director and senior scientist at the Center for Science and Democracy at UCS explains, “UCS has long worked to protect science-informed decisions from politicization, and I am both excited and comforted to see that the Biden administration’s new framework aligns so closely with our recommendations. This is an important milestone for anyone who depends on our government to use unfettered science in its decisions to protect the public and our environment—and that is pretty much all of us!”



UCS Senior Scientist Recognized for Contributions to Security

The American Physical Society (APS) awarded UCS Senior Scientist Laura Grego its annual Leo Szilard Lecture-Lecture Award for her “significant,

influential analyses of critical issues in international security and arms control, especially in the areas of missile defense, space weapons, and space security.” As the Szilard Award winner, Dr. Grego will give lectures at an APS meeting and at two or more educational institutions or research laboratories over the year.

Grego earned her doctoral degree in experimental physics from the California Institute of Technology and has been

working at UCS for 20 years. She recently completed a Stanton Nuclear Security Fellowship at MIT’s Laboratory for Nuclear Security and Policy and co-directed a study on the US missile defense system for the APS Panel on Public Affairs.

The Leo Szilard Lecture-Lecture Award was established

in 1974 as a memorial to the Hungarian-American physicist who played a key role in the Manhattan Project, in recognition of his concern for science’s social consequences. Previous winners include UCS founders Kurt Gottfried and Henry Kendall, UCS Senior Scientist Edwin Lyman, and UCS board member Steve Fetter.

What Can You Do on Climate? Press Our Button!



A Sneak Peek at the Newest Electric Vehicles

UCS members took a tour of the Los Angeles Auto Show on November 18 with David Reichmuth, senior engineer in the UCS Clean Transportation Program. Reichmuth got into the nuts and bolts of electric vehicle technologies and showed how these upcoming models will continue driving the US transportation system in a cleaner direction.

If you feel overwhelmed by the magnitude of the climate crisis, you’re not alone. Unfortunately, feeling overwhelmed can lead to also feeling insignificant or helpless to make meaningful change. While it’s true that we need large-scale, institutional action on climate, your choices and your voice still matter. And there are important steps you can take right now.

To remind us that we can—and should try to—make

a difference, UCS created an interactive climate action button for our website. Click it for suggestions of simple actions you can take immediately to help support the fight for a livable climate. Some target the systems at the core of the climate crisis; some focus on micro-level choices. And all of them are important. Visit <https://climatebutton.ucsusa.org> to see what you can do today.

COMBATING AN INVISIBLE THREAT

BY DERRICK Z. JACKSON

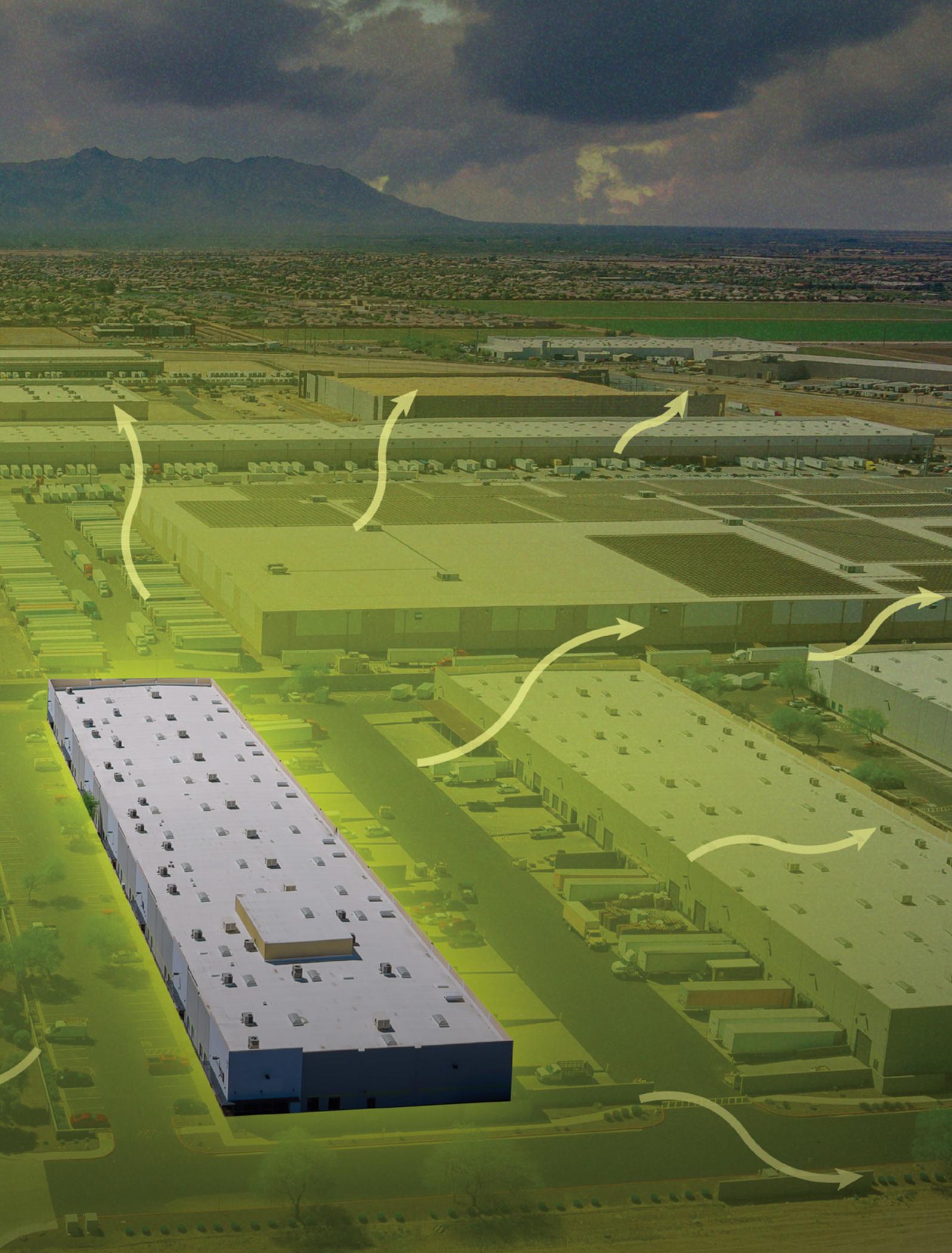
A colorless gas is causing cancer in communities across the United States. Is our government slow to act because of the color of the residents' skin?

Last September, a jury in Chicago awarded \$363 million to Sue Kamuda, a 70-year-old breast cancer survivor, ruling that her illness was caused by emissions of a colorless gas called ethylene oxide from a now-shuttered plant a third of a mile away from her home that had been run by a company called Sterigenics.

But then, in November, another jury ruled that Sterigenics was not responsible for the cancer of a separate plaintiff, Teresa Fornek. And Sterigenics is appealing the Kamuda verdict, alleging that Kamuda's lawyers "stoked passion and prejudice by, among other things, flattering jurors, inflaming class prejudices, and appealing to sympathy."

These are just two opening salvos among hundreds of pending lawsuits against ethylene oxide-emitting companies, which face growing resistance to the presence of their facilities.

Ethylene oxide is a human-made gas used to sterilize medical equipment, to the tune of 20 billion devices a year in the United States. It is also used to reduce bacteria on a third of all spices and herbs sold in the United States, and is used in the production of antifreeze, plastics, polyester, detergents, and adhesives.



But this chemical's utility comes at a high cost for workers breathing the emissions at sterilization facilities and ethylene oxide production plants, and for residents of "fenceline" communities, so named because they are next to, or directly downwind from, those facilities. Because commercial sterilizer facilities that use ethylene oxide often look like innocuous warehouses from the outside, many neighboring residents are left completely unaware that they are being exposed to it.

The plant that sickened Sue Kamuda, in the Willowbrook suburb of Chicago, was shut down by the state of Illinois in 2019 after a vigorous protest campaign. One reason why Willowbrook residents may have gotten the state's attention and won is because their community is nearly 80 percent White.

A major, and as yet unanswered, question is how much attention the rest of the plants will get as they fume away, especially those in Black and Brown communities. According to a new Union of Concerned Scientists report, *Invisible Threat, Inequitable Impact*, more than 14 million people live within five miles of 104 separate facilities that emit ethylene oxide, including a disproportionately high number of people of color, low-income households, and people with limited English language proficiency compared with the average for the county in which they live. These five-mile zones, many near commercial sterilizer facilities, also include more than 10,000 schools

Understanding the Threat from Ethylene Oxide

Scientific evidence began to accumulate in the late 1970s that ethylene oxide (also known as EtO) is a human carcinogen. Ethylene oxide exposure by inhalation is linked primarily to two cancers: leukemia and breast cancer. In addition, acute exposure can cause headache, nausea, and neurological issues, and may cause damage to the central nervous system, kidneys, and liver.

Our new report, *Invisible Threat, Inequitable Impact*, looks closely at where these facilities are located and who is most at risk from two major types of ethylene oxide-emitting facilities in the United States. By mapping these facilities, we were also able to identify "sterilizer hotspots" in which people may be exposed to ethylene oxide emissions from more than one facility. Our analysis also finds that within five miles of these facilities, there is a higher proportion of people of color, people with low income, and people who speak a language other than English compared with the county and US averages.

and childcare centers. And they are only a portion of the total number of facilities nationwide that emit ethylene oxide.

WEAK STANDARDS, INSUFFICIENT MONITORING

Much of the problem stems from the fact that ethylene oxide emissions have yet to be sufficiently regulated or monitored by the Environmental Protection Agency (EPA).

The EPA says it is now considering requiring certain facilities to reduce ethylene oxide emissions, but this move comes after decades of advocacy by communities and workers dealing with harmful exposure. For example, Clean Power Lake County, a UCS partner, has fought to limit ethylene oxide emissions from the Medline Industries commercial sterilizer in a predominantly Latino section of Waukegan, Illinois. Or take Allentown, Pennsylvania: more than 30 residents there have sued the B. Braun commercial sterilizer facility on the basis that ethylene oxide emissions are responsible for elevated cancer rates in their community.

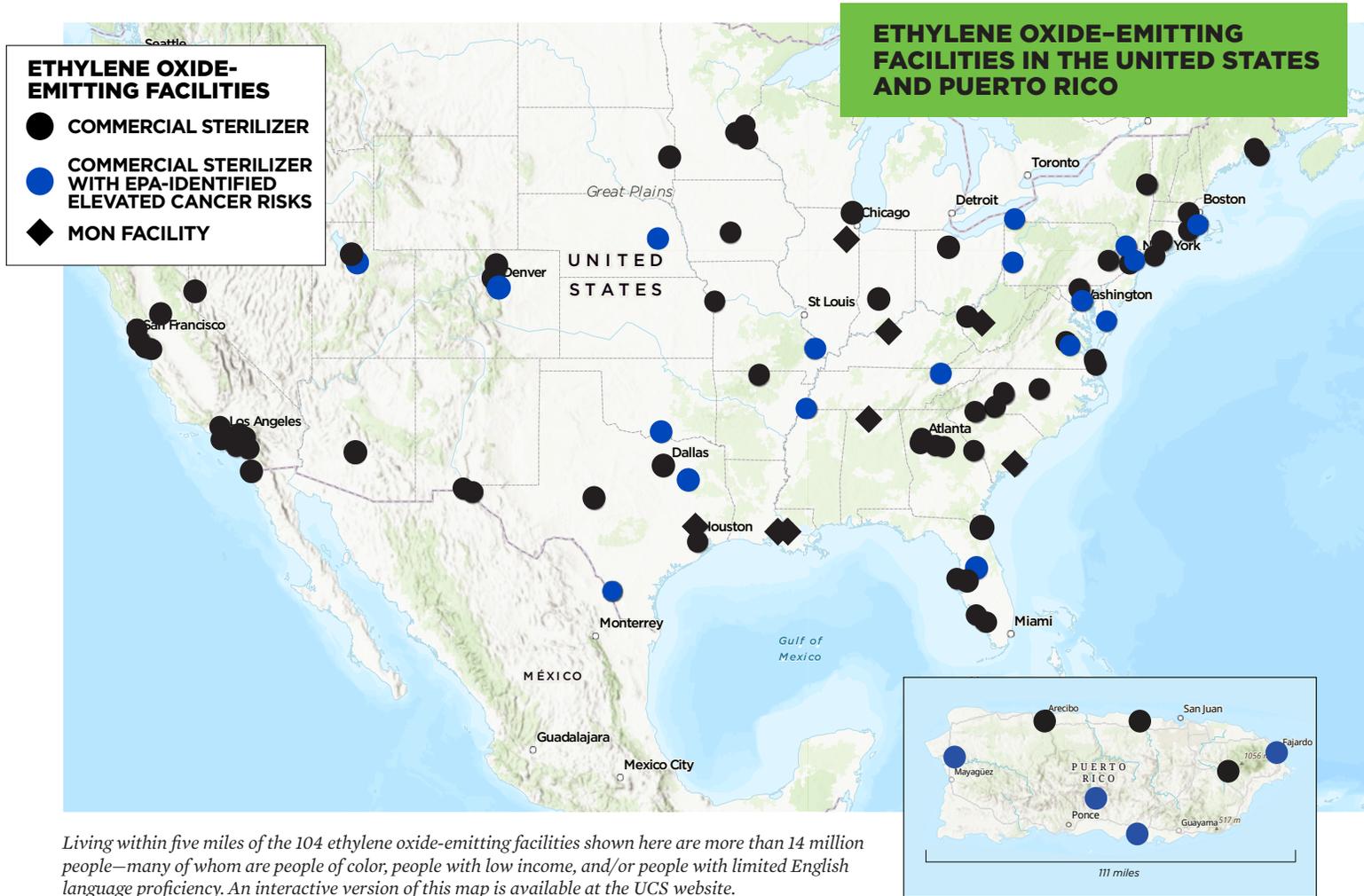
Community members and workers should not have to carry the burden of ensuring that facilities emitting cancer-causing gas control their emissions. The Clean Air Act requires the EPA to update emissions standards for hazardous air pollutants every eight years, and the agency was due to update its commercial sterilizer rule in 2014. It is now nine years late in doing so. Moreover, it has been seven years since the EPA's Integrated Risk Information System (IRIS) program updated its risk assessment for ethylene oxide inhalation, which determined that the chemical is a carcinogen. If that weren't enough, in 2022, after assessing risks to communities near active US commercial sterilizers, the EPA determined that the cancer risk level in 23 communities exceeds its threshold of 100 cancer cases per 1 million people.

As UCS's research shows, on average, a typical sterilization plant or ethylene oxide production facility is likely to be situated in areas with higher concentrations of people of color, people with low incomes, and families where English is less likely to be a first language. For example, the UCS report highlights sterilization plants situated in:

- a neighborhood of South Memphis that is 87 percent Black and 57 percent low-income;
- a section of Atlanta with 96,000 people that is 92 percent people of color (when the county as a whole is 58 percent people of color);
- Laredo, Texas, where nearly 95 percent of more than 83,000 people are people of color.

Then there is Puerto Rico—a notorious dumping ground for the sterilization industry. It has the third-highest number of sterilization plants in the nation, behind much larger and much more populous Texas and California. Of the 23 facilities that the EPA has singled out for elevated cancer risks, Puerto Rico has four—two with the highest risks among all those listed. The population within five miles of these plants is 99 percent people of color.

Community members and workers should not have to carry the burden of ensuring that facilities emitting cancer-causing gas control their emissions.



There are seven sterilization plants on the island, within five miles of 413,000 people and about 300 schools and childcare centers.

FOLLOWING THE SCIENCE

At the end of 2022, the EPA rebuffed a well-funded disinformation campaign and reaffirmed that ethylene oxide poses a danger to humans. In final rules issued under the Clean Air Act for facilities regulated under the Miscellaneous Organic Chemical Manufacturing (MON) source category, the agency said it would hold firm to the science it has gathered over the years that connects ethylene oxide to cancer.

For three years, a troika of the state of Texas (the nation's largest ethylene oxide polluter), the American Chemistry Council, and Texas-based Huntsman Petrochemical had lobbied the EPA to exclude any data concerning lymphoma or breast cancer in women, claiming that the risk value for

ethylene oxide was 4,000 times lower than what the agency had proposed. UCS helped fight back by filing a legal brief with other environmental groups calling for more stringent rules.

The EPA finally held firm, rejecting the industry's claims by noting that, "Available epidemiologic data provide strong evidence of an elevated breast cancer risk in female workers exposed to ethylene oxide."

As welcome as this development is, it is still just a first step.

NO MORE TIME TO WASTE

The EPA under the Biden administration says that the singling out of high-risk facilities is part of its effort to ramp up its monitoring. Officials have traveled around the country to hear the concerns of residents. What remains unclear is the level of control the EPA will ultimately impose on plants and what enforcement will mean for those companies that resist.

(continued on p. 21)

Fossil Fuel Divestment and the ABCs of ESG Investing

INTERVIEW WITH LAURA PETERSON

Despite the fact that extreme weather events driven by climate change are wreaking havoc across the country, congressional Republicans have joined forces with two dozen Republican state attorneys general to try to curb what the financial sector calls environmental, social, and governance (ESG) investing—particularly those investments that seek to address the climate crisis.

Laura Peterson, a corporate analyst with the Union of Concerned Scientists' Climate Accountability Campaign, has been following this controversy closely.

Can you start by explaining what ESG investments are and how they differ from other sustainability investment strategies?

LAURA PETERSON: ESG is often used interchangeably with the terms “socially responsible investing” (SRI) and “impact investing,” but there are important differences. ESG funds take into account a company’s environmental, social, and governance practices, such as its climate policies or its executive compensation, but their primary goal is always to maximize financial returns. Socially responsible investing involves choosing or disqualifying investments based on specific ethical criteria. A good example would be screening out tobacco company stock. The goal of impact investing,

meanwhile, is to help a business or organization support a specific social benefit, such as expanding women’s education or developing renewable energy resources.

Even proponents of ESG investing would agree that it is not being implemented perfectly. ESG disclosures vary from company to company. Ratings agencies that assess company data use proprietary methods, making it hard for investors to know how investment firms reach their conclusions. And there is growing concern that some asset managers are slapping ESG labels on funds that don’t deserve them.

That’s why the US Securities and Exchange Commission (SEC) proposed rules that would tighten standards governing how investment firms and advisers market ESG funds, as well as

require funds branded as ESG, SRI, or other similar terms to invest at least 80 percent of their assets in areas suggested by those terms.

How much money have asset managers put in ESG investments and how much are they expected to grow?

LAURA PETERSON: According to US SIF: The Forum for Sustainable and Responsible Investment, as of January 2020, assets using sustainable investing strategies represented a third of all US assets under professional management. And that percentage will undoubtedly increase. Bloomberg Intelligence estimates global ESG assets are set to jump from \$35 trillion today to \$50 trillion in 2025.

ESG opponents claim that “woke” asset managers are politicizing their investments by adopting ESG criteria instead of focusing solely on financial returns, as required by law. What is really going on here?

LAURA PETERSON: In reality, asset managers are responding to growing investor demand for ESG products, which generally favor renewables over fossil fuels because of the threat posed by the climate crisis. Doing so has not undermined performance. Studies show that ESG investments generally result in returns that are comparable or even



As a corporate analyst and advocate with UCS, **LAURA PETERSON** works to hold fossil fuel companies accountable for the damages they’ve caused and their role in the climate crisis. Peterson has an extensive background in investigative journalism and strategic research. She has served as staff to the US Senate’s main oversight committee, a policy analyst for watchdog groups including the Project on Government Oversight and Taxpayers for Common Sense, and a journalist for the Center for Public Integrity and *Foreign Policy* magazine, as well as a correspondent in Turkey and the Balkans. Read more from Laura on our blog, *The Equation*, at <https://blog.ucsusa.org>.

Asset managers are responding to growing investor demand for ESG products, which generally favor renewables over fossil fuels because of the threat posed by the climate crisis. Doing so has not undermined performance.

better than investments that only take into account financial factors.

Regardless of what ESG opponents are saying, big banks and investment firms are still financing the fossil fuel industry to the tune of hundreds of billions of dollars a year. For example, one of the ESG opponents' main targets—BlackRock—has nearly \$260 billion invested in fossil fuel companies around the world, including \$91 billion in Texas, the first state to enact a law banning divestment from the fossil fuel industry.

That said, it is more difficult for companies to obtain financing for oil and gas projects than renewable energy projects because of the mounting impacts of climate change. Lenders have been calculating those risks and factoring them into the cost of credit.

Ironically, ESG opponents are the ones who are trying to politicize investments to favor the fossil fuel industry. That could backfire, yes?

LAURA PETERSON: That's right. A recent study by the Wharton School of Business and the US Federal Reserve found that Texas cities will pay an additional \$303 million to \$532 million in interest on \$32 billion in borrowing during the first eight months after the Texas anti-divestment law was enacted.

The SEC has proposed a rule that would mandate and standardize climate disclosures by publicly traded companies. What is the status of that rule, and what impact would it have?

LAURA PETERSON: The SEC proposed a draft rule last March that would compel publicly traded companies to assess and

report on how climate change will affect their bottom lines and, by extension, investors and the general public.

Among its provisions, the rule would require companies to disclose the amount of global warming emissions their businesses produce, estimate how commodity price changes might affect their profits, and detail their plans for implementing carbon emissions reduction targets.

The fossil fuel industry, its trade associations, and the think tanks, advocacy groups, and members of Congress it funds oppose various provisions of the proposed rule, claiming that they fall outside the commission's mandate and impose what they consider burdensome reporting requirements, especially

when it comes to so-called Scope 3 global warming emissions—those that result from the use of a company's products, such as gasoline—as opposed to direct emissions from a company's operations, called Scope 1, or emissions from the electricity it uses, called Scope 2.

UCS supports the rule, which has strong support in the investor community. We have called on the SEC to strengthen it in several ways, including by requiring companies to publicly disclose their direct and indirect political activity and how they are addressing climate justice. We have joined with investors and other advocates to urge the SEC to finalize and enforce a strong rule as soon as possible. As the climate crisis worsens, there is no time to waste. {C}

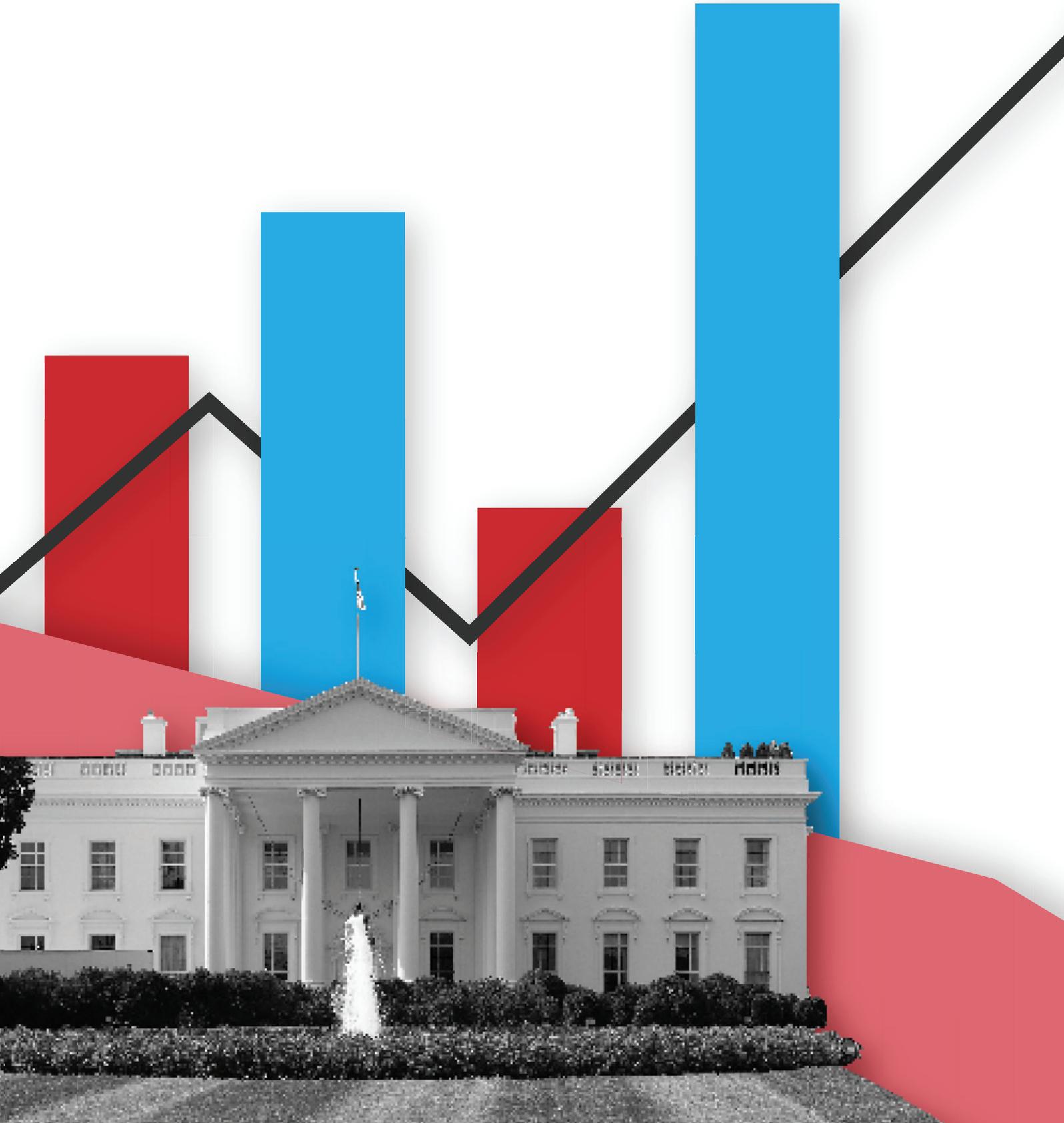
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MAKING SCIENTIFIC INTEGRITY STICK

UCS surveys have shown political interference in federal science rises and falls from one administration to the next. It's time for that to stop.

BY SETH SHULMAN

First the good news: the results from the latest Union of Concerned Scientists survey of scientists at US federal agencies show considerable progress. Strong majorities of scientists at all six agencies we surveyed say the Biden administration has largely protected scientists and their work from political interference. Some sample findings:

- More than 75 percent of government scientists surveyed say their agencies are adhering to stated scientific integrity policies.
- Some 70 percent of scientists at the Food and Drug Administration say they can openly express concerns about mission-driven work without fear of retaliation—that's the highest percentage we've seen at that agency in the six times UCS has asked that question over the course of four separate administrations.
- More than 70 percent of scientists at the US Fish and Wildlife Service report that they have received adequate training about their agency's scientific integrity policies—the highest proportion yet at that agency.

All told, we found morale and overall job satisfaction higher for federal scientists than at any time since we began collecting data—through the George W. Bush, Obama, and Trump administrations. The results represent a victory for the Biden administration. They also testify to UCS's strong leadership on this constellation of issues.

SCIENTIST SURVEYS OVER THE YEARS



2006



2008



2010

A KEY WATCHDOG ROLE

To fully appreciate the progress represented in the latest survey results, it's useful to think back to the administration of George W. Bush. That's when UCS first raised the issue of what we termed “scientific integrity” in the federal government and helped put it on the public agenda. It's also when we first got the idea to survey federal scientists.

At that time, UCS had amassed strong anecdotal evidence that the Bush administration was suppressing and distorting the findings of government scientists when those findings ran counter to the administration's political preferences. While political debate over issues is healthy and inevitable, all sides should make decisions that are supported by solid scientific data and analysis. Actions that erode the public's trust in science not only undermine the government's ability to make informed decisions but also threaten public health and safety.

So, to better assess the situation, we decided to survey government scientists themselves. When we did so for the first time, we found the problem was even more extensive than we had feared. For example, as documented in our 2006 analysis *Voices of Federal Climate Scientists*, a remarkably large number of federal climate scientists had witnessed or experienced political interference in their work:

- 73 percent of respondents said they had perceived inappropriate interference with climate science research over the previous five years.
- 58 percent said they had personally experienced such interference—and that number increased to 78 percent among scientists whose work frequently touched on sensitive or controversial topics.

Findings such as these showed a widespread politicization of government science. It was clear that stricter oversight was needed to address the problem, so UCS began to push hard for stronger rules and procedures to protect government scientists and the integrity of their work.

Today, this effort is led by the Center for Science and Democracy at UCS. Its work surveying federal scientists in order to hear directly about their experiences is one of UCS's

longest-running projects. The latest survey, administered at the end of 2022, is the tenth we've conducted.

The surveys to date have helped shine a spotlight on the need for strong safeguards that allow government scientists to do their jobs and report their results without interference. The survey results have been picked up by the media and used in congressional hearings, helping to pinpoint where further investigation and policy reform are needed. And, importantly, federal agencies have paid close attention to the UCS survey data and have used them to improve their scientific integrity policies.

REMAINING PROBLEMS

Despite notable progress, all the findings in the 2022 survey are not rosy. Scientists are still noting unacceptably high levels of interference in their dealings with the press and the public, and they report capacity problems and burnout as well.

Across federal agencies, somewhere between 15 and 36 percent of scientists surveyed reported that they have been asked or told to omit certain words deemed politically contentious from their scientific work products—percentages roughly equivalent to the Trump administration and far higher than they should be.

The vast majority of scientists surveyed said they still need to obtain pre-approval from their agencies before they can speak with journalists, and a majority report that there has not been a significant improvement in their ability to communicate their work to the public since the previous administration.

Perhaps most worrisome, large majorities continue to report that a lack of staff capacity is negatively affecting their agency's ability to fulfill its science-based mission. A striking 71 to 89 percent of the scientists across different agencies reported feeling burnout and identified workforce reductions as a major cause.

ADMINISTRATION-PROOFING SCIENTIFIC INTEGRITY

Perhaps the main lesson we can take away from 18 years' worth of scientist surveys is the extent to which they have documented unacceptably large fluctuations between “science-friendly” administrations and those that are more openly hostile to science.

More than half of the EPA scientists we surveyed in 2018, for example, reported that the effectiveness of their offices and



2012



2015



2018



2022

departments had decreased during the Trump administration. Now more than 60 percent say that effectiveness has increased compared with two years ago.

To be sure, even in more science-friendly administrations, federal scientists have reported instances when scientific decisions are swayed by politics or political influence has inhibited their ability to carry out their agency’s mission. In our 2015 survey during the Obama administration, for example, somewhere between 46 and 73 percent of respondents at different agencies said they felt that political interests at their agencies were given too much weight.

But, under administrations openly hostile to science, the surveys have exposed unacceptable increases in the level of political interference in the work of government scientists—which can mean serious consequences for the public’s health and safety. For

one recent example, under former President Trump, then-head of the EPA Scott Pruitt refused—likely for political reasons—to ban chlorpyrifos, a pesticide found by the agency’s own analysis to affect children’s brain development. (Under President Biden, the EPA banned its use on food crops in 2021.)

We’re happy to see the gains in this latest survey and gratified to see stricter scientific integrity protocols become institutionalized. (See p. 6 for more.) But we’re equally aware how fragile and potentially ephemeral these gains are. That’s why it’s so vital to codify agency rules into law, through bills like the Scientific Integrity Act introduced in the last Congress. UCS will continue to push hard for its passage and to monitor any progress or backsliding by the current administration, because we know that impartial science and solid data are essential for making good decisions regardless of which party is in power. {C}

WHY DOES UCS MONITOR SCIENTIFIC INTEGRITY?

Because our health, safety, and well-being depend on it.

Whether government scientists are tracking the path of a hurricane, ensuring the safety of our food and drugs, or battling the virus behind a pandemic, we all rely on federal agencies’ use of unfettered, impartial science. There’s nothing partisan or even political about it: you can’t do a good job of protecting people without rigorous, reliable science and data. Many of our federal laws stipulate that the government base its decisions on the “best available science.” Surveying scientists at the nation’s science-based federal agencies is one way we help ensure our government is living up to this responsibility.

THE 2022 SURVEY—BY THE NUMBERS

UCS sent a detailed, 57-question survey to 46,616 potential respondents across six federal agencies: the Centers for Disease Control and Prevention (CDC), the Environmental Protection Agency (EPA), the Fish and Wildlife Service (FWS), the Food and

Drug Administration (FDA), the National Oceanic and Atmospheric Administration (NOAA), and the US Department of Agriculture (USDA).

We received and tabulated answers from 1,828 federal scientists—an overall response rate of 3.92 percent—spread relatively evenly among federal agencies and representing a diverse population in terms of gender, race, sexual orientation, and tenure at their agencies.

To ensure the highest-caliber practices, we conducted this survey in partnership with the University of New Hampshire’s Survey Center, receiving the university’s Institutional Review Board (IRB) approval, and implementing strict data protections and anonymization procedures to assure survey participants their data were being protected as stringently as possible.

The full set of survey results and comparisons with previous administrations is available at www.ucsusa.org/surveys-scientists-federal-agencies.

Tactical Nuclear Weapons

By Claudia Ward-de León

Within the first few weeks of Russia's invasion of Ukraine, media reports and expert commentary were dissecting President Vladimir Putin's implied threats that Russia might use so-called tactical nuclear weapons to dissuade the United States and other NATO countries from further aiding Ukraine. If a tactical nuclear weapon were to be used in Ukraine, it would break a taboo against the use of nuclear weapons that has not been broken since the United States dropped atomic bombs on Hiroshima and Nagasaki in 1945.

In general, tactical nuclear weapons are designed to be used on a battlefield, and usually have a shorter range and less explosive power than "strategic" nuclear weapons. While the distinction is somewhat arbitrary, strategic weapons have been limited by numerous arms control treaties, but tactical nuclear weapons never have been. In the US stockpile, the B61 is the only tactical nuclear weapon.

HOW DANGEROUS ARE THEY?

Because of their supposed utility in combat, tactical nuclear weapons are sometimes misleadingly described as "small." But the most important thing to know about them is that they are full-fledged nuclear weapons and therefore unspeakably dangerous. Some tactical nuclear weapons have yields as great as—or greater than—the 15-kiloton bomb dropped on Hiroshima, which instantly killed more than 70,000 people and reduced the city to ruins. The idea that using a tactical nuclear weapon would be anything other than a catastrophe is wholly inaccurate—even one nuclear explosion could spread radiological contamination over a wide area, especially in weather

Tactical nuclear weapons are sometimes misleadingly described as "small," but they are full-fledged nuclear weapons and unspeakably dangerous.

conditions with high winds. See the figure to compare the destructive power of the B61 (in various options) compared with the bomb dropped on Hiroshima.

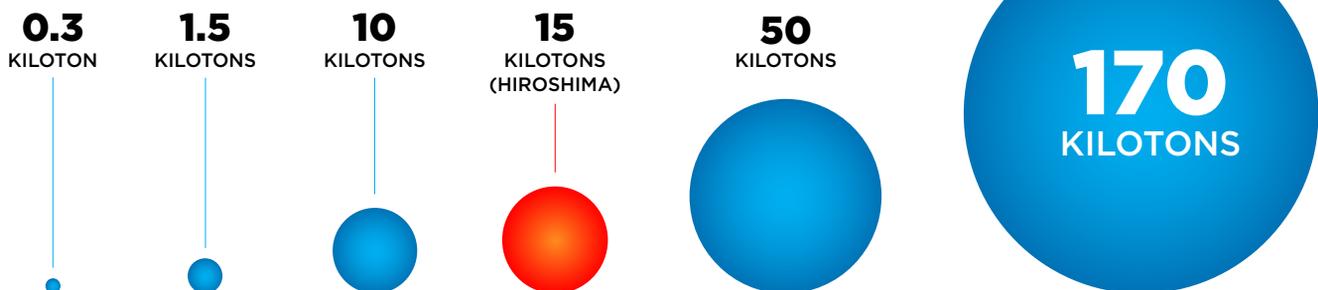
WHAT CAN WE DO?

The best thing we can do to reduce the danger of tactical nuclear weapons is work to eliminate *all* nuclear weapons. Although no one can control Putin's actions, we must do everything we can to avert the very real possibility that using a tactical nuclear weapon leads to all-out nuclear war. The Union of Concerned Scientists is committed to bringing cutting-edge science and solutions to conversations with policymakers about reducing the risk of nuclear war and the United States' reliance on nuclear weapons in its security policy.

As individuals and constituents, we need to tell our legislators about our priorities. Learn more about tactical nuclear weapons and the policies UCS is fighting for at www.ucsusa.org/resources/tactical-nuclear-weapons. {C}

US TACTICAL WEAPONS VARY IN THEIR DESTRUCTIVE POWER

The single tactical nuclear weapon in the US stockpile, the B61, is available in different destructive yields—two of which are larger than the bomb that killed more than 70,000 people in Hiroshima, Japan, in World War II.





Cooking with Gas? It's Time to Move On

By Elliott Negin

Back in the day, when someone said, “Now you’re cookin’ with gas,” it was a good thing, like being “on a roll.”

It turns out the expression was originally coined in the late 1930s for a “natural” gas industry advertising campaign trying to convince consumers to replace their wood-fired stoves with gas stoves rather than electric ones.

How times change. Now, the evidence increasingly shows that if you’re cooking with gas, you may well be subjecting your family to toxic indoor pollution.

MOUNTING EVIDENCE

Recent studies have found that gas stoves emit hazardous pollutants, including nitrogen dioxide and volatile organic compounds (VOCs), as well as the global warming gas methane, which leaks mainly when the stoves are off. Your exposure depends largely on how well ventilated your kitchen is.

A 2022 study by Stanford researchers found that nitrogen dioxide emissions from certain gas burners and ovens exceed the US Environmental Protection Agency’s (EPA) *outdoor* air standard within just a few minutes of operation. (The EPA has no indoor air standard.)

Nitrogen dioxide has been linked to childhood asthma and chronic obstructive pulmonary disease. Indeed, a study published just last December, led by the Rocky Mountain Institute, found that more than 12 percent of childhood asthma cases in the United States are attributable to gas stoves.

Meanwhile, in another 2022 study, researchers at the Harvard T.H. Chan School of Public Health and PSE Healthy Energy collected unburned gas from stoves and pipelines in the Boston area and detected 21 VOCs, including hexane, toluene, and benzene—a known carcinogen.

All of the stoves in the Stanford study leaked methane, the

primary component of gas. Like nitrogen dioxide, methane combines with other pollutants to form ground-level ozone (or smog), and it is more potent than carbon dioxide as a global warming pollutant.

BEYOND GAS

In the aggregate, US reliance on gas is a significant cause of climate change. According to the EPA, burning gas for heating and cooking is responsible for 79 percent of global warming emissions from residential and commercial buildings, which overall account for 13 percent of total US carbon emissions.

To address the problem going forward, some 80 municipalities, including Berkeley, Denver, New York, and San Francisco, have banned the use of gas in most new buildings. Not many states thus far have followed suit. Only Washington has enacted a similar law and New York Governor Kathy Hochul recently called for one, but 21 states, most with Republican-controlled legislatures, have passed laws prohibiting cities from banning gas in new commercial or residential construction.

But what about the 40 million homes—more than a third of US households—that currently cook with gas? They now have an incentive to switch, thanks to the landmark Inflation Reduction Act (IRA), which will provide \$4.5 billion in consumer rebates for an array of electric appliances, including ovens and cooktops.

“These point-of-sale rebates will be especially attractive to low- to moderate-income households,” said James Gignac, Midwest senior policy manager with the UCS Climate and Energy Program. “But first we have to ensure that states apply for federal grants that are expected to be available later this year. It will be up to them to set up the programs to make it all happen.” {C}

The Post-Pandemic World We All Deserve

(continued from p. 2)

a nurse in Minneapolis, tells me about the conditions hospital workers are asked to work under, and disparities in patient outcomes, I'm thinking about rights for healthcare workers, and what we will need to stem other virulent dimensions of our public health crisis. These include persistent environmental racism, exacerbated by climate change—which I believe is among the deadliest public health emergencies today, as lethal as the novel coronavirus.

Girded by the public health-oriented work that the Union of Concerned Scientists has been doing for decades, I am ready to fight for a future that includes a federal scientific enterprise unfettered by political interference (see p. 14), and empowered to enforce science-based protections for industrial chemical plants that pollute the air and water and spread disease among neighboring communities (see p. 8). This future includes justice for the survivors of exposure to fallout from nuclear weapons testing, and for the

individuals and families living near highways and freight corridors whose health is affected by particulate matter emissions. It includes funding to shore up the Black, Brown, and low-income communities hit first and worst by climate impacts. It includes provisions for healthy soils that will produce healthy food, protections for the workers who grow our food, and access to good, nutritious food for all of us.

I'd be remiss if I didn't also mention mental health as a crucial dimension of public health. All of you know firsthand the psychological toll that living with the impacts of climate change takes on us. I hear from my daughter, Anna, and my millennial and Gen-Z friends about the intense pressures they're bearing in their young lives, including pandemic isolation, social polarization, and their sharp awareness of the rapid pace of climate destruction. These heightened pressures cause grief and distress about the future, as well as drive the younger

generations' courageous activism today.

UCS is working for a better world, one in which we bring along care and concern for all and leave behind systemic indifference to people's health and well-being. The pandemic has clearly showed us the failures (and occasionally the strengths) of the systems designed to protect us.

Now it's time for us to imagine—and enact—the science- and evidence-based protections for our physical and mental health that will allow us to continue building a better future. The White House has taken a crucial step closer by releasing a framework this January that protects science-based decisions from undue political interference, based on years of UCS advocacy and including many of our recommendations (p. 6). This is the vital work we're engaged in every day, and we're so grateful to have your support. {C}

Johanna Chao Kreilick is the president of UCS.

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Every day without updated emissions standards for facilities that emit ethylene oxide is another day communities are placed at risk from the cancer-causing gas. Enough is enough.

Combating an Invisible Threat

(continued from p. 11)



Chicago resident Sue Kamuda prevailed in a lawsuit last September against Sterigenics, a company that ran a plant near her home that emitted ethylene oxide. The jury ruled that the colorless gas caused Kamuda's breast cancer. (A decision is pending as Sterigenics has appealed the verdict.)

The chemical industry's ability to stall is abundantly evident from the years it spent trying to exclude breast cancer from the EPA's ethylene oxide risk value analysis.

Based on UCS's latest findings and stories from around the nation, there is no more time to waste.

In Texas, ProPublica and the *Texas Tribune* reported on children in Laredo who were developing leukemia in the shadows of the biggest sterilization plant in the state, Midwest Sterilization.

ProPublica's analysis found that "more than 60 percent of the 6.9 million Americans who face heightened excess cancer risk from industrial air pollution are imperiled solely based on their exposure to ethylene oxide." It also found that more than 40 percent of Laredo's 70,000 schoolchildren go to class in areas with seriously elevated cancer risks.

In Delaware, a state with dense corridors of toxic industries, residents challenged the EPA last year to account not just for individual impacts of ethylene oxide, but how it might interact with other toxic compounds to harm humans. Resident Sandra Smithers told the EPA in a virtual listening session that the agency's concerns about ethylene oxide did not "instill confidence" because the whole community knows that it's not just "one chemical [that] impacts the community."

As Darya Minovi, a senior analyst at the Center for Science and Democracy at UCS and lead author of the new report, explains: "Every day without updated emissions standards for facilities that emit ethylene oxide is another day that communities may be exposed to this cancer-causing gas. Enough is enough. The danger is real, and the EPA needs to act on its own science to protect communities from harm."

Increasingly, US residents are becoming aware of the risks posed by ethylene oxide emissions and the federal government's inaction to date. It is long past time to turn this terrible situation into one that can inspire confidence in the government's effort to protect fence-line communities.

Visit www.ucsusa.org/resources/invisible-threat-inequitable-impact for our full report and interactive map on ethylene oxide risks, a fact sheet, an explanatory video, a link to submit a public comment to the EPA, and other helpful community resources. Spanish-language versions of the fact sheet, interactive map, and video are also available. (C)

Derrick Z. Jackson is a UCS Fellow in climate and energy and the Center for Science and Democracy at UCS. Read more from Derrick on our blog, *The Equation*, at <https://blog.ucsusa.org>.

“Danger Season” Teaches Lessons in Climate Resilience

By Kristina Dahl



The UCS climate team spent much of last summer monitoring the impacts of “Danger Season,” when climate change pushes the planet’s usual summer

heat waves, hurricanes, and wildfires into dangerous new territory. Despite the heavy toll exacted by these extreme weather events, Danger Season is also showing us how communities can become more climate resilient. Here are some examples:

Strong building codes. Hurricane Ian caused widespread damage to Punta Gorda, Florida, when it slammed into the Gulf Coast last September. But a subset of Punta Gorda’s homes fared pretty well: those that had been rebuilt after Hurricane Charley in 2004. That’s because Florida enacted some of the nation’s strictest building codes in the 1990s, so homes rebuilt after Charley are much more hurricane ready. With the Biden administration pushing federal agencies to help communities modernize their building codes, more communities could soon benefit from such forward-thinking standards.

Planning for extremes. Babcock Ranch, Florida, made headlines during Hurricane Ian because the solar array that powers the community stayed up while thousands of neighboring communities lost power. All the decisions that went into this community’s development helped it weather the storm: choosing a site located beyond the reach of storm surge, designing parks and streets to



Babcock Ranch, Florida, was developed with resilience in mind; its forward-thinking decisions enabled the community to survive the devastation that Hurricane Ian wrought on neighboring communities last September.

absorb floodwaters, and putting power lines underground where they’re not susceptible to wind damage. The fact that Babcock Ranch came out of Hurricane Ian largely unscathed shows that it is possible to design climate-resilient communities.

Effective, actionable communication. During one of the most severe California heat waves on record, state-wide energy demand hit an all-time high and the state’s electricity grid manager warned of rotating power outages. The governor then sent out a cell phone alert asking residents to reduce power use for a few critical hours. Electricity demand dropped steeply within 10 minutes of sending the alert and blackouts were averted. Ultimately, we need a more reliable, more flexible grid. But this example shows that, with effective, actionable communication, people can and will respond to an energy emergency.

Taking care of each other. The Boyle Heights Arts Conservatory is a community organization in East Los Angeles that normally hosts quilting clubs, cartoon mornings, and youth arts events. Because it has recently upgraded its HVAC system and installed air quality monitors, the conservatory can also now serve as a cooling center, complete with games and pizza. Because the conservatory is already part of the community, it’s a natural place to turn to cool off. Such social and community connectedness is essential for resilience.

Building climate resilience will be a decades-long challenge, but examples like these show that it is within our reach. {C}

Kristina Dahl is a senior climate scientist in the UCS Climate and Energy Program. Read more from Kristina on our blog, The Equation, at <https://blog.ucsusa.org>.

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