Union of Concerned Scientists

Catalyst

Volume 25, Winter 2025

Save Science, Save Lives

Inside our fight to defend science

Introducing UCS President Gretchen Goldman

How Much Electricity Do Data Centers Consume?

[Union of Concerned Scientists]

Change Is Possible If We Work Together

As a young person, Phartiyal noticed plastic bags piling up in this lake near her home, and worked with her friends to enact a plastic bag ban in her town.

By Pallavi Phartiyal

In the Himalayan foothills of northern India where I grew up, my friends and I used to row in a lake with stunning views. We were out on the boat one day when I noticed there were lots of plastic bags floating in the water, and just as many dead fish, possibly choked or suffocated by the bags.

Our town depended on that lake and its ecosystems for drinking water, fishing, tourism, and recreation. I brought it up with my friends, and together, we began visiting local businesses and town leadership to raise our concerns. This was in the 1990s, when plastic pollution wasn't yet a hot topic. And we were just kids. But my friends and I succeeded in securing a ban on plastic bags in our town. I didn't know it then, but that was my first of many campaigns to come.

I live near a different set of mountains now, in California, nearly 8,000 miles from my hometown. But I've carried the lesson with me that each of us can change the world for the better, even if it's the smallest of improvements, even if we feel powerless in the broader context—and especially when we join forces with friends and allies. My classmates and I certainly didn't ban plastics everywhere, or in all forms. But we protected our local lake.

You'll see this theme throughout this issue of *Catalyst*: making change where we can and celebrating the power of those changes. This includes the Union of Concerned Scientists' campaign to support federal scientists working in an anti-science administration (p. 8), our continued push to hold fossil fuel companies accountable for their deception (p. 14), and our new guide that helps people living in communities unfairly burdened by pollution work together to protect each other's health (p. 6).

All of us at UCS are grateful for your unwavering support of science and advocacy, and for keeping your faith in our power to make change together. Despite the political headwinds, we are doubling down on our defense of science-based policies, and upholding public participation in those processes to protect our air, water, health, and the planet. {C}

***Pallavi Phartiyal** is vice president of programs, policy, and advocacy at UCS.*

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Photos: Tara Rice (Pallavi Phartiyal); Pallavi Phartiyal (lake)

UCS ON THE RECORD . . . AND HAVING AN IMPACT

"Every day that passes, people could continue to be exposed and continue to not know what's happening in their community."

DARYA MINOVI, *UCS research analyst, in a press release on why the EPA should strengthen its new standards limiting emissions of the carcinogenic gas ethylene oxide*

"Love that they're focused on making more kinds of electric cars!"

BRENDAN QUINN *(via Instagram, @Quinnspiration3) on our* This Is Science *podcast live from the Los Angeles Auto Show. Listen to the episode "Road Rave" at www.ucsusa.org/podcast..*

"1,800 fossil fuel lobbyists went to COP29 . . . and I still can't get approved to attend."

GWEN LYNN *(via Instagram, @inagreenminute) on the overrepresentation of Big Oil companies and their allies at the annual UN climate summit held in November 2024 (see p. 7)*

"[This] move is in clear defiance of scientific realities and shows an administration cruelly indifferent to the harsh climate change impacts that people in the United States and around the world are experiencing. . . . The scientific imperative to address the climate crisis remains clear and necessitates urgent actions."

RACHEL CLEETUS, *UCS climate and energy policy director, in a press statement on the Trump administration's decision to withdraw from the Paris Agreement*

"Do we have enough power plants?' is the classic question every utility asks every year. The beauty of the batteries is that if there's energy in them, they can be used for unexpected needs."

MIKE JACOBS, *UCS senior energy analyst, in a syndicated Associated Press story on growing battery storage capacity in the United States*

[FEATURES]

[ALSO IN THIS ISSUE]

Meet the 2024 UCS Science Defenders

At the end of each year, the Union of Concerned Scientists recognizes Science Defenders: individuals or groups who use science to improve the world. We're pleased to introduce our 2024 winners, and hope their courage, values, and compelling work will inspire you as they have inspired us.

CONNECTING SCIENTISTS, PROTECTING SCIENCE

Dr. Rebekah Tromble: Several years ago, Tromble, a political scientist, experienced online threats and harassment grounded in lies about her important and groundbreaking work. Recognizing that her experience was not unique, she began studying how scientists can better protect themselves from similar attacks and challenges. She co-founded the Researcher Support Consortium and the Coalition for Independent Technology Research—groups that support scientists experiencing coordinated campaigns of intimidation and misinformation. As attacks on science continue to increase, Tromble is launching another initiative, Expert Voices Together, which is focused on providing direct crisis-response support services to targeted scientists in need.

SHINING A LIGHT ON ENERGY AFFORDABILITY

Dr. Destenie Nock: "I became an engineer because I want to help people," says Nock, whose research identified a phenomenon connecting energy use to income level: low-income households turn on their heat earlier than higher-income households, and wait longer before turning on air conditioners. Nock used this data to found Peoples Energy Analytics, a startup that evaluates energy use and identifies households that could benefit from existing support programs. Now, utility companies can reach out to households that might need support, helping prevent bills from piling up or power getting cut off. This means wider use of existing assistance programs—and more households able to keep their lights and heat on.

FACING CLIMATE CHANGE WITH HUMANITY

John Morales: Meteorologist John Toohey-Morales' emotional reaction to Hurricane Milton's unprecedented rapid intensification as it approached the Florida coast in October 2024 struck a chord with millions. A hurricane specialist for WTVJ in Miami, Morales has been a steady presence on the television screens of South Floridians for decades, providing expert analysis on weather events in English and Spanish. "I used to be a cool cucumber," he says. "But I've been in this profession for 40 years, and I don't feel I can be non-alarmist anymore."

HIGHLIGHTING SCHOLARSHIP, ACTIVISM, AND ENGAGEMENT

Dr. Dominic Bednar and Dr. Regan Patterson: Amid the Black Lives Matter movement and the birth of Black Birders Week (created to celebrate Black scientists and nature lovers), this pair of researchers planned their own organization, Black in Environment, that would increase the visibility of scientist-advocates like themselves. They produced a week of events for the first #BlackInEnvironWeek, held remotely in 2021; three years later, their first in-person conference convened nearly 300 participants, panelists, and speakers, including EPA Administrator Michael Regan. "It was really beautiful to see the impact we had, which was beyond what we'd imagined," says Patterson. "It reaffirms the need for this space and reinvigorates us to create it."

Illustration: Nick Davis-Iannaco/UCS

Clean Energy Wins Will Save Consumers Billions

Late last year, UCS energy analysts secured a pair of wins from two regional transmission organizations (a.k.a. electrical grid operators): the Midcontinent Independent System Operator (MISO) and Pennsylvania-New Jersey-Maryland Interconnection (PJM). In December, MISO announced a historic, nearly $22 billion investment that will drive significant grid modernization, enabling a clean energy buildout that prioritizes reliability and delivers measurable benefits, including energy savings, for the 30 million people in its Midwest territory. The new investments put the region on a path to achieve a 96 percent reduction in carbon emissions, with wind, solar, and storage meeting more than 80 percent of regional energy needs by 2042.

"The Midwest is about to get a major clean power boost, generating jobs and economic growth," says UCS Associate Director of Transmission Policy Sam Gomberg. "UCS advocated for more than a decade at MISO and in state legislatures and agencies for this enormous investment in grid modernization."

And last fall, UCS co-authored a legal complaint to the Federal Energy Regulatory Commission against PJM to prevent the repeat of an unnecessary $12 billion cost increase it foisted upon ratepayers in 2024, due to market rules that allowed owners of fossil fuel–fired power plants to artificially raise prices for consumers. PJM, which manages a power grid extending across 13 states, changed its rules in response. UCS Senior Energy Analyst Mike Jacobs says, "This is a major win for the 65 million people who rely on PJM to keep their lights on."

Discover the Harms of Fossil Fuel Power in Your Community

We need to produce affordable electricity in a way that meets everyone's needs, promotes public health, and protects our environment. Renewable energy checks all the boxes—but the fossil fuel industry and entrenched utilities want to preserve the status quo by delaying a shift away from the nation's drastic overreliance on gas-fired power plants.

To investigate special-interest narratives about potential approaches to cutting gas plant carbon emissions, UCS developed a new tool—specifically intended for public use—to see wide-ranging impacts of three solutions the gas industry supports: hydrogen co-firing, carbon capture, and biomethane use. For communities and the climate, the implications of this closer look are clear: use renewables more, use gas plants less.

This tool and an accompanying issue brief are already empowering communities across the country as they consider fossil fuel industry–backed proposals to reduce gas plant pollution locally. Check them out for yourself here: www.ucsusa.org/resources/beyond-smokestack.

UCS MEMBERS ANSWER THE CALL

In the fall issue of *Catalyst* we announced the new UCS Science Emergency Fund, a campaign to bolster our ability to defend science when it's under attack. We were blown away by the response from our supporters. You helped us surpass our ambitious year-end fundraising goals—*and* your generous support allowed us to launch a new campaign, "Save Science, Save Lives" (see p. 8), while continuing to advance our most crucial program initiatives. Whether it's exposing attacks on science, holding fossil fuel companies accountable for their pollution, or ensuring clean energy and transportation policies stay strong, your generous support is critical to making this work possible. *Thank you!*

But the work isn't finished. If you haven't yet contributed to the Science Emergency Fund, it's not too late. We need your support most in the first 100 days of the Trump administration; make a tax-deductible donation at **www.ucsusa.org/EmergencyFund** by April 30.

Photo: Scott Olson/Getty Images

UCS Cumulative Impacts Work Fills a Void in Fighting Pollution

Minneapolis-area residents on an environmental justice tour learn about the multiple pollution harms facing low-income communities and communities of color in the state. The firsthand experience of environmental justice communities informed the tools and strategies outlined in the new UCS guide on cumulative impacts.

You know you've created a much-needed tool when you get a flurry of next-day responses and requests for more. That was the case for the UCS publication *The Community Guide to Cumulative Impacts: Using Science and Organizing to Advance Public Health Policy*, released last fall.

"We immediately received requests for presentations and workshops about it from the scientific and environmental justice communities. People want to learn more about cumulative impacts," says co-author and UCS Senior Scientist Kristie Ellickson.

Across the United States, health and environmental policies do too little to protect people from harmful chemicals and pollution. One key reason is that our laws and regulations consider each toxic chemical or polluting facility in isolation—but no one is exposed to just one chemical at a time, from one source at a time. Instead, our bodies are subject to the *cumulative* impacts of exposure to multiple chemicals from multiple sources.

Developed by environmental justice leaders and experts based on what actually happens in their communities, the UCS guide is a repository of proven strategies and tools for organizers who are calling for a new, more comprehensive approach to regulating chemical and pollution exposure.

"We've heard from staff that the guide informed expert review of the Environmental Protection Agency's cumulative impacts training modules," Ellickson says.

She and co-author Kathleen A. Curtis from the Coming Clean Network paid particular attention to the needs of communities that are already overburdened by socioeconomic stressors and disproportionately affected by cumulative impacts. With that in mind, they worked with community partners like Comunidades Organizando el Poder y la Acción Latina (COPAL) and Rise4EJ—among others—to produce Spanish- and English-language versions of the guide. (Find the guide online at www.ucsusa.org/resources/community-guide-cumulative-impacts.)

UCS Bilingual Outreach Coordinator Andrés Bachelet shared the guide at a Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) conference, where it was well-received. "Participants called it a better way to look at regulation and pollution," he says.

Since its publication in October, *The Community Guide to Cumulative Impacts* was featured in *Compass Newsletter*, a science communication publication. And the project team led workshops for the Southern Environmental Law Center, where they received feedback from environmental justice partners that the guide will support their education efforts and organizing around the issue.

Dr. Amy Kyle, a retired University of California–Berkeley professor and longtime expert on cumulative impacts, called the work of collecting the information "a service," noting the immense effort it would take for any one person to find all the resources on their own—"even without the additional task of making sense of it."

Photos: Carolina Ortiz/COPAL (Minneapolis); Sean Gallup/Getty Images (Rachel Cleetus); Melissa Varga/UCS (Beaker)

UCS Experts Express Disappointment with Climate Summit's Outcome

UCS Climate and Energy Policy Director Rachel Cleetus speaks to reporters at the United Nations climate conference in Baku, Azerbaijan, about the draft conference agreement.

After attending the annual United Nations climate talks (COP29) last November, UCS representatives who traveled to Baku, Azerbaijan, returned with a strong message for future summits: no more Big Oil lobbyists should be welcome. Fossil fuel interests permeated COP29, with nearly 1,800 industry lobbyists granted access to the venue.

"They overwhelmed the delegation of almost every country, especially those from the most climate-vulnerable nations," says Kathy Mulvey, UCS accountability campaign director. Mulvey and the UCS delegation observed with dismay as oil and gas companies and their allies, with unlimited access to negotiators, worked against global interests.

UCS hoped world leaders at COP29 would secure a climate finance agreement that provides adequate support for lower-income nations in their transition to clean energy and protects communities from the ravages of the climate crisis, while reaffirming nations' commitments to sharply cut emissions and phase down fossil fuels. Instead, says UCS Climate and Energy Policy Director Rachel Cleetus, who also attended COP29, "Rich nations including the United States and European Union countries strong-armed a deeply unfair and inadequate climate finance outcome, despite their starring role in causing the climate crisis."

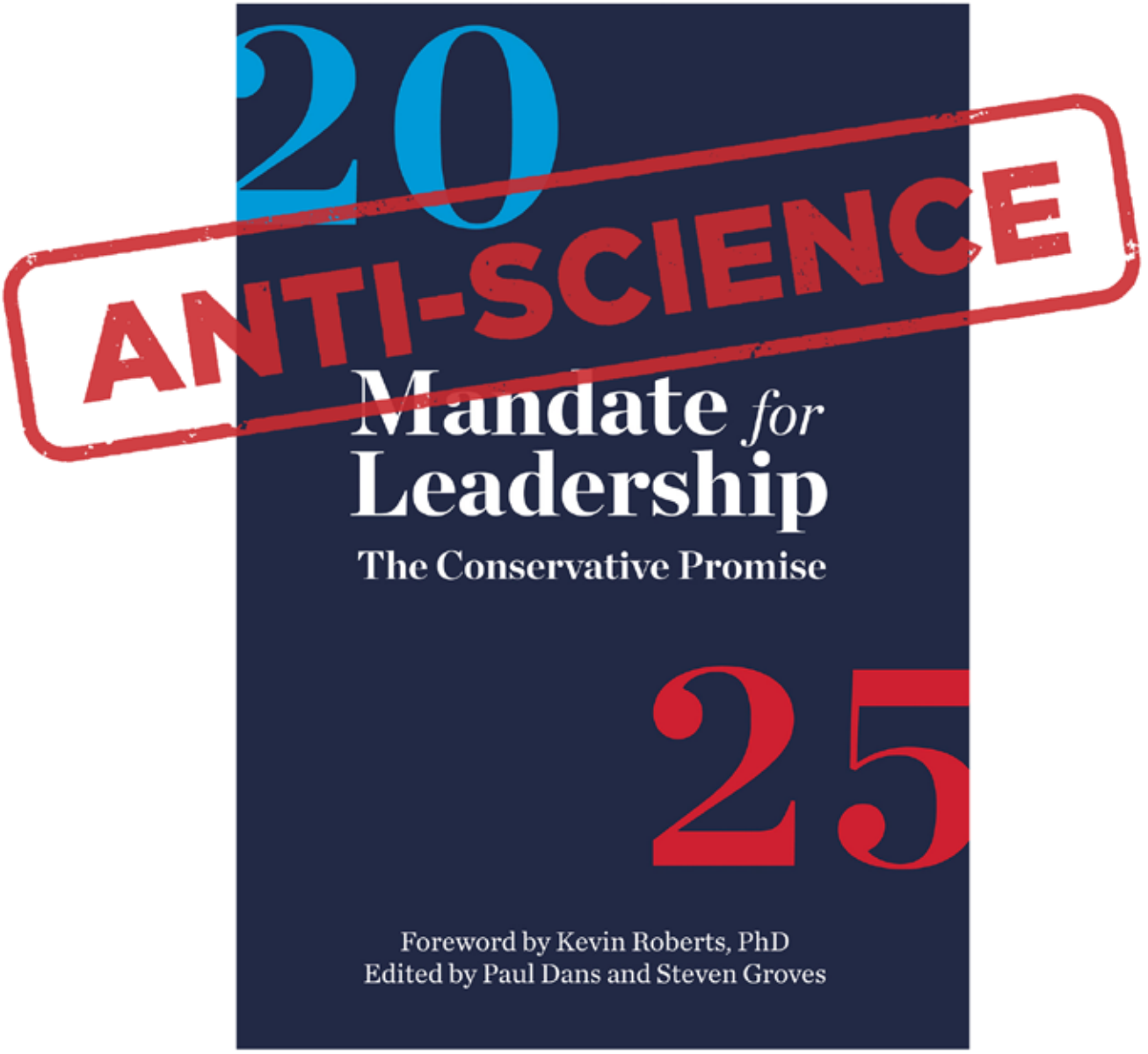
The final deal was woefully insufficient to the challenge at hand, reflecting the malign and deceptive influence of the fossil fuel industry and powerful nations in the grip of its short-term profits. Says Mulvey, "It's time for the COP parties to grow a backbone and kick big polluters out once and for all."

UCS Welcomes a New President

After a multi-phase search process lasting nearly a year, UCS has hired a new president: Gretchen Goldman, who worked at the Center for Science and Democracy at UCS from 2011 to 2021, most recently as research director. "Goldman stood out among a talented pool of candidates with her extraordinary vision, government and NGO policy experience, unparalleled science advocacy, and commitment to environmental justice," says Anne Kapuscinski, chair of the UCS board of directors. "Her wide-ranging expertise will help UCS advance its mission of using rigorous science to build a healthy, safe and just future." For more on Goldman's background and plans for UCS, see Inquiry (p. 12).

Beaker Shares His Love for Government Scientists

In December, Beaker—the Muppet lab assistant with whom many UCS scientists identify—took a trip to Washington, DC, to visit attendees at the annual American Geophysical Union conference. In addition to bringing joy and levity to the scientific community, he helped spread the word about the new UCS "Save Science, Save Lives" campaign (see p. 8). He was later spotted a mile away at EPA headquarters, expressing his deep love and respect for federal government scientists. When pressed for details on his visit, the UCS staffer inside the media-shy Muppet simply replied, "Meep!"



Illustrations: Heritage Foundation (book cover); Cynthia DeRocco/UCS (stamp)

THIS IS HOW WE FIGHT BACK

The Trump administration may have its destructive Project 2025 agenda—but UCS has its own plans for defending science and ensuring a safe and sustainable future.

BY PAMELA WORTH

Since taking office in January, President Trump has followed through on his promised anti-science policies, including confirming the intent to withdraw the United States from the Paris Agreement, ending environmental justice initiatives in the federal government, appointing climate deniers and supporters of the fossil fuel industry to cabinet positions, and attempting to purge scientists from the federal workforce. These actions are repeats of the first Trump administration—but much has changed since 2016.

Thanks in part to Union of Concerned Scientists members' generous support via our Science Emergency Fund (see p. 5), we were able to prepare for this moment and act even before President Trump entered the White House. Since the election, we've been carrying out these plans, while leaving room to be nimble and strategic in response to unanticipated attacks on science. We are committed to defending against attacks on science and science-based policies by the White House and Congress, supporting federal scientists in their crucial roles, strengthening relationships with members of Congress who can hold the line on our issues, and focusing on the states and regions where we know we can make real progress on our goals.

FIGHTING ATTACKS ON SCIENCE

Between 2017 and 2021, UCS documented a staggering 200 attacks on science launched by the first Trump administration, including overturned regulations on dangerous chemicals, suppression and censorship of scientific information, mismanagement of data on COVID-19, and many more (see the sidebar). Anticipating more of the same, UCS launched our "Save Science, Save Lives" campaign immediately after the election. We circulated a **petition urging members of Congress** to oppose attempts to politicize or eliminate scientific roles, agencies, and federal research that protect our health, environment, and our communities. More than 50,000 scientists, experts, and activists signed on in five weeks, delivering a powerful message to legislators.

"We're proud of the ways we helped expose and contain the threats to science and the public interest during the first Trump administration," says Pallavi Phartiyal, vice president of programs, policy, and advocacy at UCS. "We're bringing the same energy and focus to the new threats that are already apparent in the early days of the second term. We don't have the option of complacency."

UCS is **taking control of the narrative** around the most damaging actions the administration is taking and has threatened, and spotlighting the communities that are harmed when science is sidelined, when federal scientific agency staff and programs are cut, and when facts are distorted to serve private and corporate interests.

With Congress, we have **set a high bar for nominees** to key agencies. We have organized—and will continue to organize—opposition to the most egregious nominees. And whether nominees ultimately advance or not, we will continue to weigh in during the nomination process to ensure that science has a voice, and that Congress is doing its job in vetting candidates carefully.

The first Trump administration removed references to climate science throughout government websites and documents. The second administration has begun a similar purge. Just as we did eight years ago, UCS is documenting this erasure and supporting partner organizations to **identify data that must be preserved.**

Increasingly, experts at federal agencies are the subjects of negative scrutiny and harassment. Thanks to more than 50 years of working on behalf of scientists, UCS is known as a trustworthy resource. We have collected and publicized **resources for federal scientists** acting as whistleblowers and those being harassed or intimidated.

Gretchen Goldman, recently named UCS president, at a rally in 2017. As we did during the first Trump administration, UCS is committed to defending against attacks on science.

Photo: Anthony Eyring/UCS

We are also **pushing back on blatant giveaways** to the fossil fuel industry at the expense of the public—for example, freezing the funding of Inflation Reduction Act initiatives, which will harm businesses and workers across the nation. While we may not be able to defeat all harmful proposals, we are fighting to limit the worst excesses.

PUSHING FOR PROGRESS

"There are still many lawmakers in Congress who care about US leadership in clean energy, about diplomacy and peace, and about protecting public health," says Phartiyal. "And there are still opportunities for UCS to make progress at the federal level." UCS is **building and maintaining relationships with members of Congress** who can be champions for the issues we all care about:

- **Climate change**, which affects everyone regardless of politics. UCS will continue to publicize how climate change fuels extreme weather, the increasing risks and costs we can expect each year during Danger Season (when climate impacts peak and overlap), and the need to invest in resilience measures to protect people, their homes, and the economy from these impacts.
- **Reducing the threat of nuclear war** by opposing a return to explosive nuclear testing and any expansion of the US nuclear arsenal. Drawing on the expertise of our own staff and the UCS Science Network, we are fact-checking the questionable claims behind the drive for new nuclear weapons. And we'll keep working with communities harmed by the legacy of nuclear weapons development as we push for the passage of bipartisan legislation that provides justice to the survivors of nuclear testing and production.
- **A food and farm bill** that reduces the toll of US industrial agriculture on people and our climate, and agricultural policies that reduce the use of fossil fuel–based fertilizers that harm the communities where they're manufactured and the water where they're used. Together with our partners, UCS is also working toward safer working conditions for farmworkers and greater economic opportunity for the one in five people who live in the United States' rural communities.
- **Making transportation sustainable** by supporting policies to electrify cars and trucks, phase out petroleum and deploy clean fuels, reduce car dependency, and defend and advance vehicle standards. UCS is working to expand charging infrastructure and help more people benefit from electric vehicles, while advocating for improved public transit. With partners like the Moving Forward Network, we're pushing for a zero-emissions freight system.
- **Holding Big Oil accountable** for its deliberate deception about the harm its products cause (see p. 14). No matter what happens in the federal government, with your support, we will continue to publicly challenge the "greenwashing" campaigns fossil fuel companies use to clean up their image, and call out the front groups they use to do their dirty work of pushing fossil fuel–friendly policies.

(continued on p. 21)

A VICTORY OVER AN EARLIER TRUMP ADMINISTRATION POLICY

Throughout the first Trump administration, appointed leaders of federal agencies tried—and for a time succeeded—to implement a policy that would destroy the foundation of multiple health-based protections, including the Clean Air Act. Under this policy, which Environmental Protection Agency (EPA) leadership dubbed "secret science," agencies that worked with scientific data to create safeguards for protecting public health could rely only on studies that shared *every detail of their underlying data*—a major ethical violation, since most public health studies include confidential data on individual people's medical records. This short-lived rule prevented the best available science from being used to inform public health protections.

Agency leadership under President Trump hoped to keep this policy quiet. They counted on it being too esoteric for any public outcry. But UCS knew about this attack on science and fought hard for years to keep it from being implemented. UCS experts met with reporters to explain this complex topic, resulting in media coverage critical of the policy in the *Atlantic* and *New York Times*, among others. Then, when the EPA refused to follow its own procedures and hold a public hearing on the policy, we held our own hearing and gathered comments from experts.

Despite four years of us—and you—fighting this ill-advised rule, it went into effect at the EPA in January 2021, and was also implemented at the Department of the Interior (DOI). But thanks in part to our years-long advocacy against the rule, our sustained opposition campaign, and your support, there was enough evidence of its negative impact that a judge scrapped the EPA's version one month later. The next month, the DOI's new leadership overturned the policy as well.

UCS is monitoring whether this dangerous policy resurfaces under the second Trump administration.

UCS Welcomes New President Gretchen Goldman

Welcome back! You were an integral member of UCS for more than a decade. How did you get started at UCS?

GRETCHEN GOLDMAN: There were many attacks on science during the George W. Bush administration, so in 2004, UCS organized scientists to sign a public letter opposing the administration's misuse of science. Eventually, more than 15,000 scientists signed it. I'd been a student supporter of UCS for years. Straight out of graduate school, during President Obama's first term, I was hired as a UCS analyst and tasked with tracking the creation and implementation of that administration's scientific integrity policies [which UCS pressure helped secure].

I also worked on launching our climate accountability work here at UCS. Early on, we documented corporate activity on climate policy and the role of industry trade groups, and worked with shareholders to focus attention on corporate actors' role in climate change deception.

Then the first Trump administration happened.

You became a prominent UCS spokesperson during the first Trump administration, testifying before Congress and being interviewed by national media outlets. What was it like to be a science advocate in those years?

GRETCHEN GOLDMAN: It was a firehose of attacks on science once President Trump took office the first time: scientists were censored, scientific information was ignored, and reports and publications were unduly suppressed. We shifted the entire research team of the Center for Science and Democracy to focus on defending science. We documented more than 200 attacks on science, organized communities from Houston to Delaware, and explained the dangers of one anti-science political appointee and bad policy after another.

One thing we did at UCS during the first Trump administration that I'm proud of was convene an independent panel of ousted EPA science advisors. They independently reviewed evidence and issued a report after President Trump's EPA cut scientists out of the process of updating air quality standards and refused to examine the latest science on particulate matter, a dangerous and common form of air pollution.

You left UCS in 2021 to work at the White House, and then the Department of Transportation. What was that experience like for you?

GRETCHEN GOLDMAN: At the White House, I led the first government-wide guidance on Indigenous Knowledge and advanced the role of federal science in federal environmental justice activities. At the Department of Transportation, I carved out new space to advance research and technology for climate resilience and decarbonization across modes of transportation. Every day I saw firsthand the critical decisions that government scientists and other staff are charged with executing. The public will never hear about the countless people in government who are working hard to uphold scientific integrity principles. I feel like I owe it to them to do everything in my power to help them continue the great work they do on behalf of people in this country.

GRETCHEN GOLDMAN returned to UCS in February and took the helm as president. She was a founding member of the Center for Science and Democracy at UCS, where she worked as research director, leading analytical and advocacy efforts to strengthen the role of science in policy decisions. In recent years, she was the climate change research and technology director at the US Department of Transportation and the assistant director for environmental science, engineering, policy, and justice at the White House Office of Science and Technology Policy. Goldman earned a PhD and MS in environmental engineering from the Georgia Institute of Technology and a BS in atmospheric science from Cornell University.

Photo: Farrah Skeiky

> *Communities across the country and world will be affected by the coming actions of the United States and by the climate change we have disproportionately contributed to.*

Having worked both in the nonprofit sector and executive branch, what has been your biggest lesson about the influence of science advocacy on the federal government?

GRETCHEN GOLDMAN: Nonprofits and advocates, including UCS, are critical for generating ideas, driving federal action, facilitating public engagement, and pushing for fair and careful implementation of the best, science-informed policies across government decisions. Groups like ours carry important messages from affected communities and can help hold our government accountable.

UCS, specifically, has been very influential in the executive branch. Much of our past work documenting attacks on science and developing solutions was reflected in the policies and practices implemented in recent years, from scientific integrity to climate solutions.

UCS scientists work on a range of issues, from climate change to food systems to global security. For you, how are those dots connected?

GRETCHEN GOLDMAN: The thread connecting all of our efforts at UCS is science in decisionmaking. Whether we are talking about public health standards for air quality, programs to help farmers implement sustainable agriculture practices, limiting increases in military spending and nuclear weaponry, regulations to transform the way we power and move ourselves, or legislation to increase communities' climate resiliency—what connects those dots is the need for decisionmakers to be well informed by what science tells us are the best, most equitable solutions to the nation's problems.

Science will never be the only input for policy decisions. When I worked at the White House, I saw firsthand how our leaders must balance scientific considerations with economic and societal realities when crafting policy. But without good scientific input, those policies risk bad consequences. And when bad policies are created, they can worsen circumstances for the most vulnerable and marginalized people.

In this tenuous time as we watch attacks on science increase, what is the best role for UCS and science advocates?

GRETCHEN GOLDMAN: In the UCS Washington, DC, office, we used to have a cartoon hanging on the wall that said, "Can you forget for one second you are a concerned scientist?" It made me laugh—but the answer is no.

In many ways, UCS was born for this moment. Now that we see the threats to institutions more broadly, it is crystal clear why we need science at the table. Just as we did with the EPA panel in 2018, we have a chance now to ensure science-based policy activities continue. We must build the infrastructure needed to ensure science and scientists are informing decisionmakers, explaining potential threats and impacts to the public, and holding leaders accountable at all levels of government.

There is much political and societal uncertainty right now. Communities across the country and world will be affected by the coming actions of the United States and by the climate change we have disproportionately contributed to. One of the reasons we need to stay focused on science is so we can leverage it to address societal inequities. We have the opportunity and responsibility to speak up and push back for others who can't, and now is the time. {C}

Photo: AYAimages/Adobe Stock

SCIENCE IN THE COURTROOM

UCS is bringing experts together to hold fossil fuel companies legally responsible for their lies and damages.

BY ERIC SCHULZ

Last year marked a major milestone in the movement to hold fossil fuel companies accountable for their role in the climate crisis: state, Tribal, county, municipal, and territorial governments representing some 86 million people—more than 25 percent of the US public—have now filed lawsuits against corporations including BP, Chevron, ExxonMobil, and Shell.

The crux of many of these cases is straightforward: when a company lies, and people get hurt as a result, it needs to be held accountable. Research by the Union of Concerned Scientists has revealed that fossil fuel companies knew about the planet-warming effects of their products decades ago, but have deliberately misled the public about these devastating impacts in order to delay climate action and continue lining their pockets.

In the legal arena, fossil fuel special interests are attempting to tilt the scales against the scientific evidence, deploying expensive legal teams and expansive public relations campaigns. Underpinning their smorgasbord of tactics are shameless attempts to obfuscate and deny scientific realities. The need is growing for science, and scientists, to engage with and inform this type of litigation pending in courts across the world.

INFORM AND ENGAGE

The Science Hub for Climate Litigation at UCS connects scientific experts, legal scholars, and practitioners working at the intersection of science and climate litigation. "By grounding climate litigation in robust science, we can enhance understanding and contribute to informed decisionmaking in the courts and beyond," says Delta Merner, lead scientist with the Science Hub.

In her five years with UCS, Merner has made this nexus her specialty. One place this can be seen is in the progress she and her colleagues have made in pioneering the use of attribution science in litigation. Attribution science means quantifying the role human-caused climate change plays in exacerbating disasters and extreme weather events. This growing field of research is at the cutting edge of climate science, providing clear answers to whether and how climate change affected a weather event, and which emissions sources have contributed the most to climate change.

A peer-reviewed study released in 2021 examined dozens of climate accountability lawsuits filed worldwide and found a significant gap between the quality of the science submitted in these

Illustration: Ryan Fleischer/UCS; Photos (left to right): Tingey Injury Law Firm/Unsplash, Scott Webb/Unsplash, Isaac Smith/Unsplash, Tim Mossholder/Unsplash, National Library of Medicine/Unsplash, David Thielen/Unsplash

cases and the "state of the art in climate science," particularly attribution science. The UCS Science Hub is working to bridge that gap.

CONVENE AND CONNECT

For several years, the Science Hub has worked with partners to expand the community of experts interested in legally relevant research through webinars, presentations at conferences, and a regular newsletter. Last fall, the Science Hub launched working groups that bring together dozens of scientists across disciplines to apply their skills to climate litigation.

"Many scientists have never engaged with climate litigation before, or are looking to grow their skills and confidence, which is exactly why we are building this community," says Sarah Goodspeed, climate accountability outreach manager at UCS. The majority of participants in the working groups are not climate scientists—they are social scientists and economists, civil engineers and health practitioners who can bring a wide variety of expertise to multifaceted litigation.

Over the course of the year, members of these working groups will work together to effectively communicate their expertise to legal audiences including scholars, litigators, judges, and public officials. This is an important skill given the vast difference between standards of evidence in science compared to the law.

PREPARE AND PRACTICE

Last year, UCS scientists conducted interviews with practitioners and scholars across the globe to identify further research areas for climate litigation. The report, published in September 2024, identified the top three priorities for further research to be attribution science, research focused on connections between climate change and human health, and economic research that quantifies the costs of climate impacts. (Find the report on our website at www.ucsusa.org/resources/research-areas-climate-litigation.)

"Having your research inform the courts is just as valuable as informing policy," argues Merner. And the scientific community needs to prepare itself for an increased role in the courts as climate litigation spreads to more states, cities, and local governments.

UCS research has been cited in the majority of climate damages and fraud cases filed in the United States to date. Our experts are also informing international legal actions and processes, including filing briefs and providing recent testimony to the InterAmerican Court of Human Rights. The global scope of these lawsuits is staggering, with thousands of cases filed worldwide in every level of jurisdiction—including a hearing in the International Court of Justice late in 2024 that brought the largest number of testifiers ever heard before the world's highest court.

With the Science Hub for Climate Litigation, UCS is contributing the critical evidence we hope will hold fossil fuel companies accountable for their deception and help guarantee a safer, healthier future for all. {C}

***Eric Schulz** is a communications strategist at UCS.*

Photo: Paul Zoeller/The Post and Courier via AP

CLIMATE ACCOUNTABILITY FROM COAST TO COAST

CHARLESTON, SC

Below is a list of the cities, counties, states, and organizations that, as *Catalyst* went to press, are currently involved in lawsuits against the fossil fuel industry—either for deceiving shareholders and the public about the realities of climate change, or to compensate them for the climate-related damages the industry has inflicted on them.

STATES/TERRITORIES
California
Connecticut
Delaware
District of Columbia
Maine
Massachusetts
Minnesota
New Jersey
Puerto Rico
Rhode Island
Vermont

COUNTIES
Anne Arundel County, MD
Boulder County, CO
Bucks County, PA
Ford County, KS
Honolulu County, HI
Marin County, CA
Maui County, HI
Multnomah County, OR
Oakland County, CA
San Francisco County, CA
San Mateo County, CA
San Miguel County, CA
Santa Cruz County, CA

CITIES
Annapolis, MD
Baltimore, MD
Boulder, CO
Charleston, SC
Chicago, IL
Hoboken, NJ
Honolulu, HI
Imperial Beach, CA
New York, NY
Oakland, CA
Richmond, CA
San Francisco, CA
San Juan, PR*
Santa Cruz, CA

TRIBES
Makah (WA)
Shoalwater Bay (WA)

**Another suit involves 37 Puerto Rico municipalities.*

A HIDDEN TREASURE WE MUST NOT WASTE

Wetlands provide billions of dollars' worth of flood protection, but industrial agriculture is quickly gobbling up this precious resource.

BY BRYAN WADSWORTH

When looking out across the expanse of grasses and water that intermingle in one of this country's wetlands, it's difficult to fathom the importance of the world within a world before you. This is the habitat of roughly half of our endangered species, from cranes to crocodiles, and 75 percent of the fish and shellfish we harvest.

One of the reasons wetlands nurture such diversity of life is their capacity for filtering pollutants like agricultural fertilizers and pesticides, which are trapped by plant roots before they can enter rivers and larger bodies of water.

Wetlands also benefit people by protecting us from flooding. Their spongy soils and water-loving plants interrupt the flow of water from snowmelt and heavy rains, allowing floodwaters to make their way more gradually into underground aquifers and nearby streams.

Unfortunately, wetlands are under increasing threat—from commercial development, forestry, and climate change, but especially from industrial agriculture, which not only damages wetlands with polluted runoff but also converts wetlands into crop fields and livestock pastures. Wetland loss has been accelerating over the past 20 years, and the Supreme Court's 2023 decision in *Sackett v. Environmental Protection Agency* made these critical ecosystems even more vulnerable by ruling that most are not subject to the protections of the Clean Water Act.

New analysis by the Union of Concerned Scientists has calculated the cost of what is at risk in the Upper Midwest from wetland loss.

WHAT'S AT STAKE

More than 60 percent of the land in the eight states that make up the Upper Midwest (Illinois, Iowa, Michigan, Minnesota, Nebraska, North Dakota, South Dakota, and Wisconsin) is dedicated to agriculture, so wetlands here are often in close proximity to farming operations. Between 1997 and 2009, those operations caused 95 percent of wetland loss in the Upper Midwest's Prairie Pothole region, making the region more susceptible to floods that have become more frequent and severe as Earth's climate continues to warm. Last June, such floods washed out dams and bridges, damaged homes, and inundated farmlands in Iowa, Minnesota, and South Dakota.

The new UCS report *Wetlands in Peril* (online at www.ucsusa.org/resources/wetlands-peril) has estimated the value that the Upper Midwest's 30.4 million acres of wetlands provide in mitigating the impact of floods: almost $23 billion in avoided damage to residential properties every year, and between $323 billion and $754 billion in the long term. And these amounts don't cover the impacts on wildlife, outdoor recreation, and water purification that is needed to filter out agricultural pollutants.

Photo: ferrantraite/Getty Images; map: Heather Tuttle/UCS

For example, Iowa alone is expected to spend $333 million over the next five years to remove nitrates from its drinking water—a cost that will increase with further wetland loss.

Wetland loss also worsens climate change. These ecosystems are excellent at capturing heat-trapping gases—their soils hold 30 percent of the world's carbon despite covering only 6 percent of its surface—so their destruction not only means carbon dioxide in the atmosphere will go uncaptured, but carbon stored in the soil will be released as well.

According to Stacy Woods, research director for the Food and Environment Program at UCS and author of *Wetlands in Peril*, "The United States already has lost half its wetlands since our country's founding. Now, the Sackett decision has put tens of millions of acres of wetlands in the Upper Midwest at risk. The loss of remaining wetlands will have very real consequences for people living in the Midwest."

A MATTER OF JUSTICE

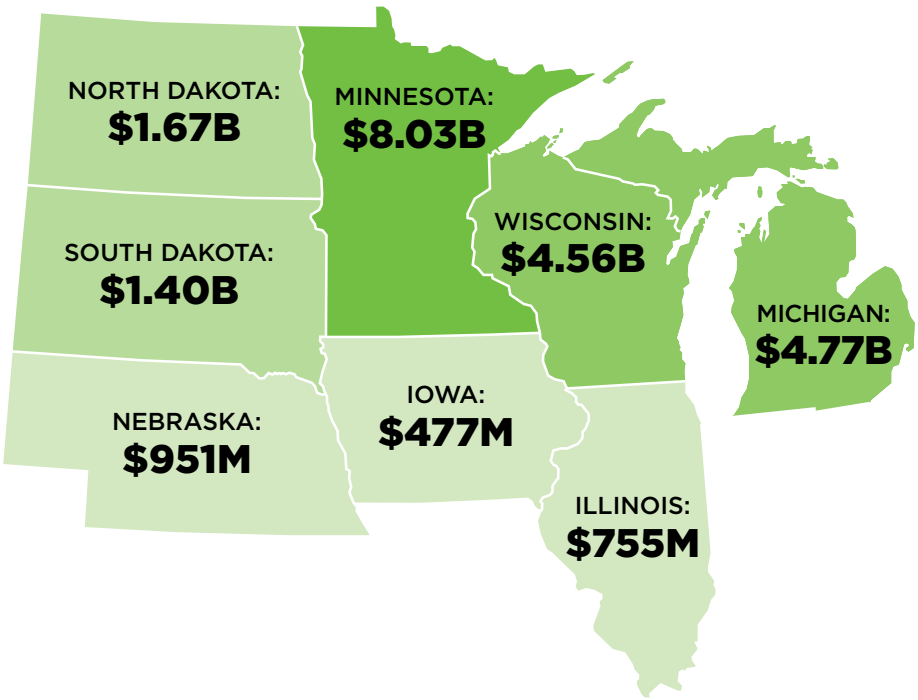
The consequences of flooding are not experienced equally by residents of the Upper Midwest. In Michigan, a history of racist housing policies and infrastructure management has led to higher flood risks for predominantly Black neighborhoods. Flood insurance costs are becoming unaffordable for many homeowners. And to make matters worse, socially vulnerable communities are less likely to receive federal disaster relief, as evidenced by the poor response to flooding in Iowa's Latino communities in 2008. More than 5 million acres of wetlands in the Upper Midwest are on Tribal lands, where local governments have taken restoration and protection of this resource upon themselves—but a broader response is needed.

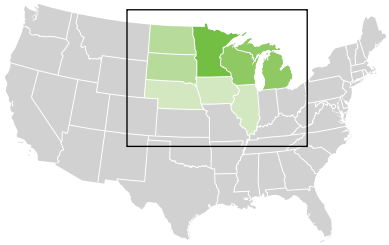
Given agriculture's threat to wetlands, the US Department of Agriculture (USDA) has a clear responsibility to act. It maintains a number of programs that can help protect wetlands or even create *new* wetlands. Despite their demonstrated success and popularity among farmers, funding for these programs has been cut over time, as have limits on the amount of acreage involved.

The five-year, trillion-dollar federal food and farm bill represents a pivotal opportunity to protect the country's wetlands by adequately funding existing USDA programs and investing in new initiatives that improve soil health while ensuring equitable outcomes for farmers and communities. *Wetlands in Peril* offers specific recommendations on these investments, which will pay off by saving both money and lives when floodwaters make their inevitable return. {C}

***Bryan Wadsworth** is managing editor at UCS.*

THE ECONOMIC VALUE OF WETLANDS





Our research found that wetlands in the Upper Midwest help prevent nearly $23 billion in flood damage each year. Protecting and restoring these wetlands may provide between $323 billion and $754 billion in long-term flood mitigation benefits to the region.

Four Ways to Reduce the Minerals Needed for Electric Vehicle Batteries

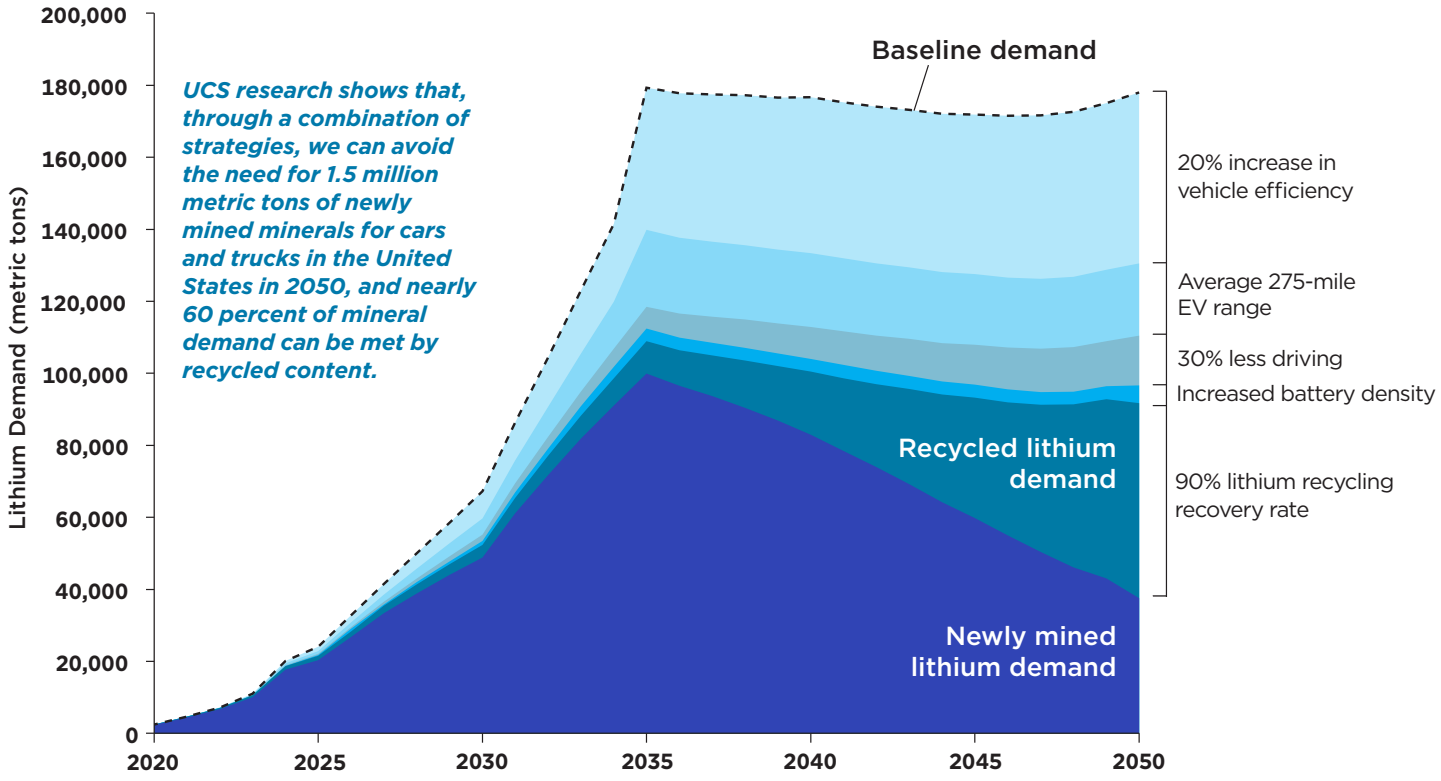
By Claudia Ward-de León

There are more than 3 million electric vehicles (EVs) on US roads today. That number is sure to increase—and so too will the demand for the materials that make up the batteries that power them. While we know EVs reduce life-cycle global warming emissions compared to fossil fuel–powered cars, mining for battery materials that power EVs (and other consumer electronics like smartphones) has harmed the health and well-being of people around the world, with disproportionate effects on Indigenous communities. A new report from the Union of Concerned Scientists estimates that we can continue the switch to cleaner EVs while mining fewer minerals than previously thought.

"A reduction of nearly half of the newly mined lithium needed for EV batteries can occur over the next 25 years with smart policies, investments, and industry leadership," says Jessica Dunn, scientist in the UCS Clean Transportation Program and co-author of the report *Making the Most of Electric Vehicle Batteries: How Recycling, Innovation, and Efficiency Can Support a Sustainable Transportation Future.* That reduction amounts to 1.5 million metric tons of lithium, or the amount needed to produce about 180 million of today's typical EV batteries.

The report identifies several ways to achieve reductions in newly mined minerals.

THE IMPACT OF DIFFERENT POLICIES ON LITHIUM DEMAND



1. RECYCLE EV BATTERIES SUSTAINABLY

As more and more people make the switch to EVs, it's essential to ensure that EV batteries are recycled and reused once the car is no longer being driven. Battery recycling must use low-impact processes that recover high rates of materials including aluminum, cobalt, copper, lithium, and nickel; these processes can be used to manufacture next-generation EVs.

To this end, UCS supports a policy approach called extended producer responsibility (EPR). An EPR program assigns responsibility for recycling to battery manufacturers, lessening the burden of battery disposal on individual owners, small businesses, and disassemblers. This model promotes a more sustainable recycling process and environmental accountability from the onset of production.

2. MAKE EV BATTERIES SMALLER

Energy-efficient EVs not only use less electricity, but also require smaller batteries to travel a given distance. Automakers and researchers should seek to innovate on battery design, creating denser batteries that hold more energy. Ensuring that future EV models are as energy-efficient as possible could cut 14 percent of lithium demand by 2035, and 22 percent by 2050—and help consumers save on charging costs.

3. REDUCE THE NEED FOR LONG-RANGE EV BATTERIES

Drivers in the United States most often use their cars for short trips, negating the need for longer-range EV batteries. A vehicle's range greatly influences its battery size, and the amount of minerals needed to produce the battery. So, slightly lowering EV model vehicle range to an average of 275 miles could reduce new lithium demand by 20 percent by 2050, compared to increasing average vehicle ranges to 325 miles. Fast, convenient, reliable, and plentiful public charging will mean less need for long-range EVs and their larger batteries.

4. PROVIDE NON-DRIVING OPTIONS

Finally, let's not forget that cars are not the be-all and end-all to personal transportation. By providing everyone in the United States with more choices in how they can get around, through alternatives including public transit, walking, and biking, along with more convenient community planning, more households could rely less on driving, reducing the demand for new cars.

Learn more about our findings at www.ucsusa.org/resources/making-most-electric-vehicle-batteries. {C}

Claudia Ward-de León *is a communications strategist at UCS.*

Illustration: Tyler Kemp-Benedict; photos (top to bottom): South_agency/Getty Images, Witthaya Prasongsin/Getty Images, Yurou Guan/Getty Images, U.Ozel.Images/Getty Images

"Giving Forward" to the Future

From their home in Portland, Oregon, Pat Bowman and Richard Kolbell apply their considerable energy and empathy to making the world a better place. Through their career choices, volunteer interests, and charitable giving, they focus on people, animals, and the environment. This most recently included naming UCS as a beneficiary of their estate, along with several other organizations doing work they believe in.

"I think we all have a responsibility to try to improve our world," says Bowman. "Maybe we have different opinions of what that means. For us, it's livability, clean air, clean water, and a belief in science." Longtime residents of Portland, Bowman and Kolbell have observed the local climate changing over time, with hotter, drier summers and more frequent wildfires.

They recall a heat wave several years ago that spiked local temperatures to 116°F. And while they agree they're fortunate to be out of harm's way for certain forms of extreme weather like hurricanes, Kolbell notes that droughts are increasingly noticeable in addition to wildfires. "Now there are more times during the year when low-water alerts are present in reservoirs, streams, and lakes," he says, "which is especially evident as you drive through the countryside. So collectively, all of those [signs] point to [the fact that] no matter what anyone with an ulterior motive tells you, [climate change] is happening."

Bowman and Kolbell are also concerned by the spread of disinformation and what they perceive as a devaluation of scientific truth. They appreciate UCS for educating audiences on crucial topics like climate change. And they say the reason they chose to include UCS in their estate planning is to "give forward to the future."

"It's a different way to give back," Bowman says. "I've been returning to the mantra of 'think globally and act locally.' So, I'm going to be kind to my neighbors. I'm going to help babysit the kid next door. And I'm also going to invest in people having more information to make informed choices. Leaving money to UCS means more to me than leaving it to a person."

Kolbell also appreciates that by supporting UCS, his concerns are amplified via the organization's reach.

"Our support of UCS strengthens the voice we can have in an enormous arena," he says. "We need people who will advocate for us and make our voice heard along with others. The work [UCS does] is delivering our voice to the decisionmakers—so I'm not just screaming in the darkness. This organization feeds my hope." {C}

This Is How We Fight Back

(continued from p. 11)

STATES ARE READY FOR CHANGE

"While our colleagues and partners in Washington, DC, will be playing tough defense, states like California will have to go all in on offense," says UCS Western States Director Juliet Christian-Smith. UCS partnerships and strong relationships with state policymakers and influential stakeholders in the West Coast, the Northeast, and the Midwest will provide opportunities to make significant progress on issues ranging from expanding renewable energy to limiting agricultural runoff.

Along with political pundits and other election watchers, Christian-Smith noticed an interesting 2024 election phenomenon: across many states, results from ballot measures and local contests indicated widespread support for climate action.

Billions of dollars of investments in US manufacturing and charging infrastructure for electric vehicles (EVs) have already been deployed across the country thanks to the Inflation Reduction Act, Bipartisan Infrastructure Law, and multiple state regulations for which UCS advocated over the past two decades. These investments are bringing clean jobs and cleaner air to thousands of communities—an improvement to quality of life that will be difficult for the Trump administration to undo. UCS will push for even more **state policies that expand access to EVs**, and keep their sales reaching record levels each year.

Investments in clean energy technologies spurred by federal laws are also positively affecting many states' economies. UCS will seize every opportunity to advocate for updating and **modernizing power grids** in the Midwest and Northeast to ensure more clean energy and storage can be brought online.

CALIFORNIA: STILL A POLICY LAB

Christian-Smith and her colleagues in the UCS Western States Program are working with California agencies and the state legislature to enact a suite of policies around climate and public health that will both protect people and the environment and demonstrate what's possible, replicable, and scalable in the world's fifth-largest economy. She says there are many opportunities for UCS experts to engage with the California Air Resources Board on tougher vehicle emissions standards, and with the California Public Utilities Commission to ensure utilities are on track to meet the goal Californians set of 100 percent clean energy by 2045. UCS water and agriculture experts are also working with the State Water Board to ensure that groundwater is protected and water rights are appropriately tracked and enforced.

Also on the UCS docket: **pushing California lawmakers and Governor Gavin Newsom** to pass legislation that will create a regional electricity grid and integrate EVs into grid operations, require EV battery recycling, and ensure that California's continued climate leadership is equitable and affordable.

A MARATHON, NOT A SPRINT

The executive orders President Trump has already issued aim a wrecking ball at a wide range of UCS priorities. And nearly every nominee he has chosen for key cabinet positions is an advocate for fossil fuel industry interests. It's a sobering landscape, but experience shows that we will have opportunities to win and rebuild momentum toward science-based policies that truly improve people's health and lives.

UCS built strong coalitions and enduring partnerships during the first Trump administration. We also asked for—and received—so much help from members like you. For four years, UCS members signed petitions, submitted public comments on federal regulations, showed up to testify in statehouses across the country, and joined us in the streets for marches and rallies. And these actions truly made a difference. We know that you care deeply about a livable climate, clean air and water, and that so many of you are ready to engage with our work and make a difference in the years ahead. Together, we'll keep working for a better world.

Stay up to date on the administration's latest attempts to sideline science—and how you can help us fight back—at www.ucsusa.org/take-action/save-science-save-lives. {C}

***Pamela Worth** is senior writing manager at UCS.*

Photos: shalamov/Getty Images (ad); David McNew/Getty Images (solar)

Can the Electrical Grid Keep Up with Data Centers' Demands?

By Mike Jacobs

Data use for applications like video calls, driving directions, TikTok, ChatGPT, and thousands more is booming. As we store and retrieve more and more data in and from "the cloud," we should keep in mind that the infrastructure supporting it is not at all cloud-like. The cloud is actually a network of data centers: large buildings that house servers and other equipment. As consumers and businesses use ever more data, data centers and the electrical grids that supply their power are laboring to keep up. Is there enough electricity readily available to meet these rising demands? The answer is complicated.

DATA DEMANDS ARE RISING RAPIDLY

The rapid growth of data centers has already changed the course of electricity supply and demand. Data centers currently consume more than 25 percent of statewide electricity in Virginia (the US leader) and more than 10 percent in Iowa, Nebraska, North Dakota, and Oregon. Newer services like artificial intelligence (AI) tend to use even more data, and thus more energy.

The latest projections estimate that globally, data center electricity demand will double *in the next three years*. This has been a shock to the usually slow-moving electricity sector, where demand was relatively consistent for decades, leading to complacency in utility planning and supply chains.

CAN RENEWABLES MEET DEMAND?

A single data center can require as much electricity as a small city. Even if power plants can produce enough energy to meet those needs, the transmission infrastructure that delivers electricity needs significant upgrades. Some big-name computer and data companies that recognize the value and reliability of clean energy, and the risks of exacerbating climate damage by relying on fossil fuel–fired power plants, have been buying energy from renewable energy power plants and helping to finance the construction of new solar and wind projects.

Even with renewable energy, data centers' total energy demand is challenging to meet. Across the United States, data center energy use grew 66 percent from 2020 to 2023, from 90 billion kilowatt-hours to 150 billion. The size and growth of US solar farms' energy production has nearly matched this for those same years. Thus, progress so far in reducing carbon emissions with large-scale solar facilities has been offset by the energy use of data centers.

THE GRID AND OUR CLIMATE REQUIRE BETTER PLANNING

Much solar and wind energy development has been stymied by inadequate transmission planning. Now, data center companies are facing the same obstacles. To protect our resources and the climate while meeting growing electricity demand, big data players must be willing to work with policymakers and utility companies to figure data centers' energy, climate, and water costs into their business models. Doing so will help us build the transmission infrastructure, wind and solar power, and battery storage we need for a modern electrical grid capable of adapting to new data technologies. {C}

Mike Jacobs *is a senior energy analyst in the UCS Climate and Energy Program. Read more from Mike on our blog,* The Equation*, at https://blog.ucsusa.org.*

An Amazon Web Services data center in Virginia is just one of the many facilities driving up electricity use. As data and AI use expands nationwide, data centers and their energy needs do too.

Photos: Richard Howard (Mike Jacobs); Nathan Howard/Getty Images (data center); liderina/Adobe Stock (ad)

Union of Concerned Scientists

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