



# Catalyst

*Volume 24, Fall 2024*

## We Need Real Representation

*Science has solutions for  
freer, fairer elections*

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## The Costs of a Car-Centric Life


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## How to Keep the Power On in Extreme Weather



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# What We Need to Thrive: Greater Access to Opportunity



By Steven Higashide



Four years ago, Texas implemented a new policy that cut the number of drop boxes where voters could safely submit their mail-in ballots. Dr. Alex Karner, a professor of community and regional planning at the University of Texas at Austin, conducted a geospatial analysis of how this would affect different groups of voters, depending on how they got around.

Now, as we head into an election with enormous stakes, I have been thinking a lot about Dr. Karner's maps.

In a tweet he wrote a few weeks before the 2020 election, he concluded that cutting the number of drop boxes was "a minor inconvenience for drivers" but represented "a poll tax on public transit users." He and Dr. Dana Rowangould, a professor of civil and environmental engineering at the University of Vermont, later refined this analysis for a peer-reviewed journal, finding that the policy change meant that 49,000 voters who relied on bus and train service in the Houston area had lost the ability to reach a drop box and deliver their ballots within an hour of where they lived.

Before coming to the Union of Concerned Scientists, I managed and conducted research into various aspects of transportation. One of the most important measures researchers use to measure the impact of changes to transit systems is "access to opportunity"—your ability to get to the things you need to thrive. It's a goal that motivates me and many others to build places with better sidewalks, bike lanes, bus lanes, and train lines.

Those maps of scarce ballot drop box locations were a reminder that we need better transportation systems to facilitate our freedom. Better transportation systems mean freedom to get a better job or an education, freedom to see our family and cherished friends, freedom to access the health care we need or worship where we want—and in the case of Houston, the freedom to choose the people who represent us.

*(continued on p. 20)*

## UCS ON THE RECORD . . . AND HAVING AN IMPACT

“I would like the public to understand that this heat is no longer a rare occurrence. It will continue to get worse year after year if we don’t make drastic emissions reductions. We need to decarbonize our energy, industrial, agricultural, and transportation sectors. There’s no way around that if we want cities like Phoenix to be livable.”

**JUAN DECLÉT-BARRETO**, UCS senior social scientist for climate vulnerability, quoted in a September 2024 Guardian story on a 100-day streak of 100°F and hotter temperatures in Phoenix, Arizona

“This summer, more than 700 scientists called for Sentinel to be canceled and the land leg of the nuclear triad retired, describing it as ‘expensive, dangerous and unnecessary.’ Canceling it would not only save taxpayers, but the U.S. would also be safer for it.”

**LAURA GREGO**, UCS senior scientist and research director, in a letter to the editor published in the New York Times, offering a rebuttal to an opinion piece calling for funding for the Sentinel missile program

“I live about 15 miles from the Paguate Jackpile Uranium Mine, which was at one time the largest open pit mine in the world. Many of my people are sick, suffering, and dying due to radiation exposure. I will continue to fight to get the Radiation Exposure Compensation Act [RECA] passed.”

**LORETTA ANDERSON**, cofounder of the Southwest Uranium Miners’ Coalition Post ‘71, from the Pueblo of

*Laguna in New Mexico, on the push to reauthorize RECA, which provides health screenings and financial assistance to those sickened by exposure to radiation from the US nuclear weapons program*

“As the grandson of Black farmers, sharecroppers, and farmworkers, I know firsthand how the injustices faced by small farmers and workers plague and hinder our food supply. The upcoming food and farm bill is Congress’s chance to right the wrongs of the past and move us out of the darkness of discrimination and anti-Black racism and into the dawn of equity and justice for Black farmers.”

**DESHAWN L. BLANDING**, UCS senior Washington representative, blogging on the historic and current racism in our food system and opportunities in the new food and farm bill to remedy some of these harms

“[T]he United States has one of the highest rates of fatalities from political violence among developed countries. . . . Luckily, this spiraling of political violence can be reversed. When opportunities to influence governance and politics become more plentiful, those engaging in violence have a tendency to hit the brakes and stop the violence. Put differently, when representative elections exist, society tends to become more peaceful.”

**CHRISTOPHER WILLIAMS**, research director for the Center for Science and Democracy at UCS, blogging on recent and historic political violence in the United States



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THE ADMINISTRATION'S PROPOSAL **FOLLOWS UCS RECOMMENDATIONS** FOR PROTECTING OUTDOOR WORKERS FROM THE RISKS OF EXTREME HEAT.

# Biden Administration Proposes Rule to Protect Outdoor Workers

The Union of Concerned Scientists sounded an alarm about extreme heat jeopardizing the lives and livelihoods of outdoor workers with the release of our 2021 analysis *Too Hot to Work*. Our report found that if no action is taken by 2050 to reduce global warming emissions, nearly 60 percent of emergency responders, construction workers, farmworkers, and other outdoor workers could experience at least one week each year when extreme heat makes it too dangerous to work outside. (Read the report online at <https://act.ucsusa.org/fall24-outdoor-workers>.)

Not being able to work for a week would mean a loss of up to \$55.4 billion in earnings every year. With the release of the report, we recommended—

and UCS supporters helped advocate for—federal protections to keep workers safe from dangerously hot working conditions.

This summer, the Biden administration responded, announcing the first-ever national heat safety standard. The proposal follows UCS policy recommendations by requiring employers to provide workers with access to shade, water, and paid rest breaks; to create and update emergency response plans; and to allow new employees time to acclimate to hot temperatures. Employers could be fined for violations that subject employees to harmful and possibly deadly conditions. The administration also announced the allocation of \$1 billion in grants that would

enable communities to prepare for climate and weather disasters such as extreme and long-lasting heat waves.

“This proposed rule is a crucial step towards ensuring nationwide protection of 32 million outdoor workers in the United States from dangerous heat that we know will become more frequent and severe due to fossil fuel-driven climate change,” says former UCS Principal Climate Scientist Kristina Dahl, a *Too Hot to Work* co-author. “Outdoor workers have up to a 35 times greater risk of dying from heat exposure than the general population. In most states, employers are not currently required to provide water, shade, and rest to their employees during extreme-heat conditions. We

know workers are routinely falling ill and even dying from heat exposure, and that these illnesses and deaths are largely preventable. They need access to rest, shade, and water codified into law.”

A strong, science-informed federal rule is critical to ensuring all heat-exposed workers in this country are protected. Only a few states have approved safeguards for outdoor workers, and two, Florida and Texas—which are home to about 5 million outdoor workers—have even made it illegal to implement local worker safety standards.

UCS will submit comments pushing for an even stronger rule, and we will share opportunities for our members to weigh in during the upcoming public comment period.

# Report on Infrastructure at Risk Earns National Attention

Vital coastal infrastructure that millions of coastal residents depend on—like hospitals, schools, wastewater treatment plants, and public housing—is at risk of increasing flooding due to climate change and rising sea levels. Low-income communities and communities of color will bear this burden disproportionately. UCS quantified these risks in our summer analysis *Looming Deadlines for Coastal Resilience*, and the nation took notice.

After the report's release, more than 350 media outlets covered its findings, including Agencia EFE, Bloomberg, CleanTechnica, *The Guardian*, *Hartford Courant*, Inside Climate News, the *Latin American Post*, El Latino, Marketplace Radio, *Mother Jones*, *New Orleans Advocate*, the *New York Times*, NPR, PBS Newshour, *Portland Press Herald*, *South Florida Sun Sentinel*,



and the Weather Channel en Español.

Find the report at <https://act.ucsusa.org/fall24-looming-deadlines> to see if infrastructure near you is at risk.



Above: flooding at the Tidal Basin in Washington, DC, endangers the city's famous cherry trees. Below: Former UCS Principal Climate Scientist Kristina Dahl discussed risks to infrastructure related to climate change, including coastal flooding, on PBS Newshour this past July with host John Yang.

## UCS Identifies Research that Would Strengthen Climate Lawsuits

Litigation can be an important tool for communities to hold governments and businesses accountable for actions and inactions that have contributed to the climate crisis and its impacts. Since 2015, more than 1,800 legal cases seeking accountability and compensation for climate impacts have been filed by community groups, cities, states, and nations around the world; at least 230 were filed last year alone.

These lawsuits rely on robust research from a range of disciplines—including climate and social science—to provide evidence supporting their arguments. Scientists who conduct legally relevant research and engage with the legal community can play a key role in moving these cases forward.

To identify areas of research that could help strengthen such cases, scientists with the UCS

Science Hub for Climate Litigation interviewed 19 legal practitioners and scholars and compiled a number of priorities based on their answers, available at <https://act.ucsusa.org/fall24-climate-litigation>. Their findings indicate that legal teams could use more findings on attribution science (which identifies and quantifies how climate change is contributing to specific trends and events), on the links

between climate change and public health outcomes, and on economic projections of money and time lost to climate impacts.

“This work underscores the important role that scientists play in climate litigation and provides a research agenda for those looking to engage,” says L. Delta Merner, lead scientist on the project. “Our goal is to help guide researchers to produce science that meets these needs.”



# New California Law Bolsters Clean Transportation and Clean Energy

Sales of electric vehicles (EVs) continue to grow across the country, especially in California, where UCS scientists are working to ensure the transition to a fully electric transportation system is sustainable and resilient. As Californians electrify their vehicles—and homes and buildings—the state must produce more electricity to meet this demand. With demand increasing, climate-fueled extreme heat and wildfires are straining grid reliability.

One solution UCS transportation and energy experts have identified and prioritized that can address both problems is harnessing the power stored *inside* the growing number of EVs and turning those vehicles into

sources—not just users—of clean electricity. UCS advocates successfully lobbied the California legislature this year in favor of this concept, known as bidirectional charging.

Senate Bill 59, which was co-sponsored by UCS, is the first law in the country that gives a state agency the explicit authority to require automakers to manufacture EVs that can power homes and appliances, and even send electricity back to the grid. The legislature approved the bill, and Governor Gavin Newsom signed it into law in September.

This is an exciting precedent. Beyond the convenience of providing power under normal circumstances, EVs enabled with bidirectional charging can

also play a significant role in maintaining grid reliability and avoiding blackouts. As blackouts have affected California, some residents have purchased generators that run on diesel and emit health- and climate-harming emissions. Many EV batteries can serve as a viable alternative to backup generators.

With bidirectional charging, utilities could also incentivize drivers to charge their EVs at times when electricity demand is lower and renewable energy tends to be abundant, and to put power back on the grid when electricity demand is high. Participating EV owners could be rewarded with lower electricity bills.

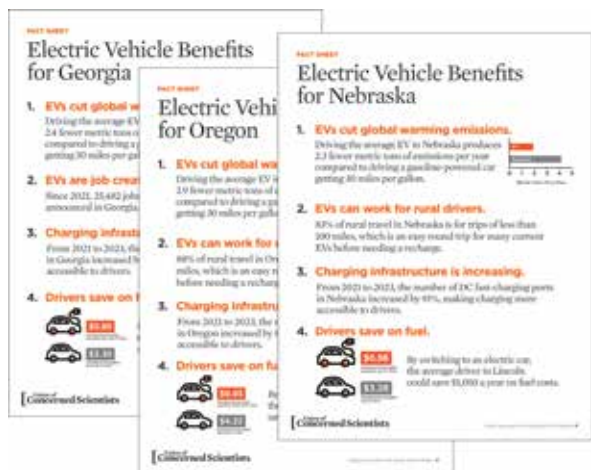
“Enabling the electricity in these vehicles to flow two

ways can make EVs a tool for increasing the reliability of our power grid,” says Don Anair, deputy director and research director of the UCS Clean Transportation Program.

“California is showing the world how to move from a dirty, extractive economy to a clean, sustainable one by advancing innovative solutions that solve multiple problems at once, like ensuring electric vehicles can bolster the grid that they draw energy from,” says UCS Western States Program Director Juliet Christian-Smith.

UCS advocacy and expert analyses proved once again to be instrumental in convincing lawmakers, pushing back on automakers’ opposition, and rallying support for the new law.





## State by State, Find Out Why EVs Are Great

Electric vehicles have come a long way in the last decade, with many models able to travel 300 miles or more between charges, making them better suited for rural drivers and people who drive long distances. Thanks to provisions in the Bipartisan Infrastructure Law and the Inflation Reduction Act, thousands of public chargers will come online in the next few years, adding to the 66,000 chargers already available across the United States. Because EVs produce no tailpipe emissions, they are one of many solutions that can minimize the worst effects of climate change, improve public health outcomes, and save consumers money by eliminating expensive trips to the gas pump.

Thinking of making the switch? Look to our series of fact sheets to see the climate, economic, and health benefits of driving electric in your state. Learn more at <https://act.ucsusa.org/fall24-electric-vehicles>.

## Where Climate Change Hits Home

Erika Spanger, director of strategic climate analytics in the UCS Climate and Energy Program, researches US climate change impacts and preparedness. In July, she traveled through 20 states across the southern and western United States, many of which have been hit hardest by climate impacts, to meet with people experiencing these impacts firsthand. During her journey, which she shared on the UCS Instagram feed, Spanger had dozens of conversations with advocates, colleagues, friends of friends, and many complete strangers generous enough to share their time and knowledge about the problems and the solutions that would help them.

“Powerful themes emerged from their stories,” she says, “and I heard one much louder than I expected: how hard it *already* is today for people to stay safe from climate change

in their homes. Protecting people where they live and advocating for housing justice are essential climate solutions.” Watch her journey at <https://act.ucsusa.org/fall24-climate-moment>.



# SCIENCE IS FACING AN EMERGENCY

*Without science in decisionmaking, there is:*

- **NO MORE EXPERTISE**  
*to inform policies that protect our health and safety*
- **NO MORE TRUST**  
*in our democracy or scientific institutions*
- **NO MORE TIME**  
*to stop the worst consequences of climate change*

***It's up to us—you and UCS—to fight back.***

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Learn more on p. 22, and scan the QR code or visit [www.ucsusa.org/EmergencyFund](https://www.ucsusa.org/EmergencyFund) to donate now.

# HOW TO SCIENCE OUR WAY TO A HEALTHIER DEMOCRACY

*Problems like poor ballot design deny voters their right to representation. UCS is pointing out the problems—and proposing solutions.*

BY PAMELA WORTH

When Research Associate Liza Gordon-Rogers interviewed for her position with the Union of Concerned Scientists, she couldn't help but bring up the shoddy ballot design she'd just encountered in a local election.

"The layout made the instructions hard to read," she says. "It's frustrating that a minor flaw like that could lead to votes not being counted, especially when we have science supporting how to eliminate or reduce these kinds of errors."

She got the job. And in that local election, her vote was counted. But that isn't the case for many people eligible to vote in the United States. Poor ballot design is a significant part of the problem, yet it's only one of many barriers to a truly representative democracy.

With her team in the Center for Science and Democracy at UCS, Gordon-Rogers is working through the first phase of a multiyear project that assesses inequities in access to voting and develops science-based policies to remedy them. Also on the team is UCS Campaign Manager Lindsey Berger, who's excited to put their findings into action.







“This year, we’ve been focused on research,” says Berger, who coordinates the UCS Election Science Task Force, a volunteer group of 21 experts from across the country—election scientists, voting rights attorneys, and community organizers, among others—who employ science to evaluate and improve how US elections are conducted. “Next year, with data in hand, we’re going to advocate for the changes we need.”

### SETTING A BASELINE

Earlier this year, UCS released a set of recommendations for counties and states on improving election data transparency, a critical step toward building a healthier democracy. And in August, we published *Race and Representation in Battleground Counties*, which analyzes data from the 2020 presidential election in 11 counties across seven states—counties that will likely be pivotal in the outcome of the 2024 election.

An interactive map accompanying the analysis (<https://act.ucsusa.org/fall24-precinct-analysis>) provides, for the first time, precinct-level information, most of which is not readily available to the public, on 2020 demographics, voter turnout, and ballot rejection rates. The map reveals significant racial disparities in both voter turnout and ballot acceptance.

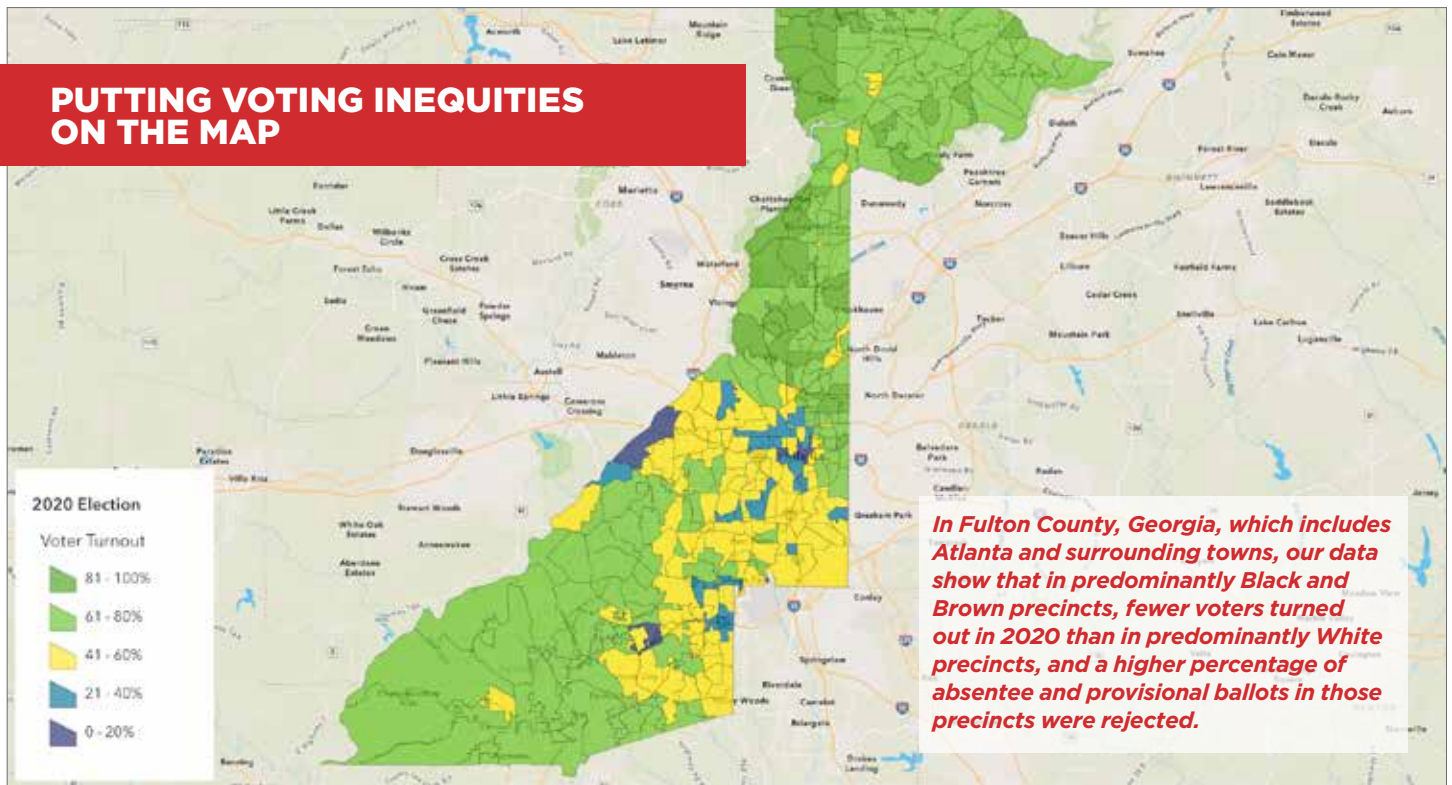
“If you live in one of the counties that we highlight, the map shows the racial disparities so clearly,” says Gordon-Rogers. “I may just be a dork for maps, but in Allegheny County

[Pennsylvania] where I live, I can see my street, I can see the demographics, and who turned out to vote. It really brings home these systemic inequalities.”

In all 11 featured counties, turnout was highest in majority-White precincts (average turnout of 78 percent) and considerably lower in majority-Black (59 percent) and majority-Hispanic (54 percent) precincts. This gap means that Black and Brown voters are systematically underrepresented in elections.

Voters living in low-turnout precincts were also more likely to have their provisional or absentee ballots rejected. In the precincts analyzed, majority-Black and majority-Hispanic precincts were twice as likely to have a higher incidence of ballot rejections compared with majority-White precincts. Widespread ballot rejections combined with the underrepresentation of low-turnout precincts make it more likely that the needs and interests of these communities will be overlooked in the policymaking process.

“Voting barriers, both historic and new, negatively impact the turnout rates of non-White communities,” says Thomas Whitaker, member of the UCS Election Science Task Force and data director at the Georgia-based nonprofit Fair Count. “And as this report shows, when those same communities do participate, they are often twice as likely as their White counterparts to see their ballots rejected. One could understand how this vicious cycle undermines confidence in further participation.”



# WHAT DOES A WELL-DESIGNED BALLOT LOOK LIKE?

**Use lowercase letters. They are more legible than ALL CAPITAL LETTERS.**

**Order contests by importance and make contest headers more prominent than candidates' names.**

**Use left-aligned type instead of centered. It's easier for the eyes to find the next line.**

**Use contrast and color functionally. Differentiate instructions from contests and contests from each other.**

**Use a minimum 12-point type size. Use one sans-serif font (Arial, Helvetica, Univers, Veranda).**

**Instructions:** To vote, fill in the oval completely ● next to your choice. Use black ballpoint pen. If you make a mistake, as Do not cross out or your vote may not count. To vote for a candidate whose name is not printed on the ballot, fill in the oval and write in the candidate's name on the blank line for a write-in candidate.

**Instrucciones:** Para votar, rellene completamente ● el óvalo próximo a su selección. Use bolígrafo negro. Si comete un error, no borre o realice otras marcas, o su voto puede no ser computado. Para votar por un candidato cuyo nombre no está impreso en la boleta, rellene el óvalo, y escriba el nombre del candidato blanco que se provee para un candidato agregado.

President and Vice-President (Vote for One) Presidente y Vicepresidente (Vote por Uno)	Representative in Congress District 1 (Vote for One) Representante en Congreso Distrito 1 (Vote por Uno)	State Senator District (Vote for One) Senador Estatal Distrito (Vote por Uno)
<input type="radio"/> Candidate 1 Running mate 1	<input type="radio"/> Candidate 1	<input type="radio"/> Candidate 1
<input type="radio"/> Candidate 2 Running mate 2	<input type="radio"/> Candidate 2	<input type="radio"/> Candidate 2
<input type="radio"/> Candidate 3 Running mate 3	<input type="radio"/> Candidate 3	<input type="radio"/> Candidate 3
<input type="radio"/> Candidate 4 Running mate 4	Write-in/Por Escrito	Write-in/Por Escrito
<input type="radio"/> Candidate 5 Running mate 5	<b>Governor (Vote for One) Gobernador (Vote por Uno)</b>	<b>State Representative (Vote for One) Representante Estatal (Vote por Uno)</b>
Write-in/Por Escrito	<input type="radio"/> Candidate 1	<input type="radio"/> Candidate 1
	<input type="radio"/> Candidate 2	<input type="radio"/> Candidate 2
	<input type="radio"/> Candidate 3	<input type="radio"/> Candidate 3
	Write-in/Por Escrito	Write-in/Por Escrito

There's no national design standard for voting materials like ballots. This can result in some counties offering clear, accessible, readable ballots, and others providing poorly designed ballots, with flaws including too-small text, unclear divisions between candidate lists, and overly complicated language.

Perhaps the most infamous example of a badly designed ballot is the “hanging chads” of Palm Beach County’s 2000 presidential election ballot—decided by fewer than 600 votes, with 4 percent of votes in that county going uncounted. A badly designed ballot makes it difficult

for voters to understand their instructions, and for poll workers to accurately count votes. A well-designed ballot, on the other hand, helps every eligible voter participate in our democracy.

Each state can adopt scientifically tested design principles to make their ballots and voter education materials more accessible and user-friendly for everyone. UCS recommends basing any ballot design on the principles used in this sample.

You can see all our recommendations for ballot design at <https://act.ucsusa.org/fall24-ballot-design>.

Gordon-Rogers says that documenting these data is crucial for shaping freer and fairer elections in the future. “If we don’t have the data, we don’t know what’s working or not working in an election; we don’t know whose ballots aren’t being counted or why not. With election data transparency, administrators can understand what’s going wrong, and how to set it right.”

Whitaker adds that the UCS report can serve as motivation and guidance to do better. “By having this information at the precinct level, advocacy groups [can] use this report to help choose the areas across these battleground counties that should be prioritized for voter education and mobilization in 2024 and future years,” he says.

## DATA DON'T LIE

The data in the UCS analysis are also critical for disrupting attempts to spread disinformation—for example, false claims

of non-US citizens voting, or single voters stuffing boxes with multiple ballots. To be clear: instances of this kind of voter fraud are vanishingly rare.

“The data make it harder for bad actors to be able to spread their lies,” says Berger.

Ballot rejections occur for more commonplace reasons, says Gordon-Rogers. “For example, sometimes people get confused and vote in the wrong precinct, and their vote doesn’t get counted. When we look at the data, the reality is election officials aren’t accepting incorrect ballots.”

Gordon-Rogers stresses that inequities in our elections are systemic, and not the fault or responsibility of individual election workers. Part of the problem, she says, is a lack of resources for election administrators and their staffs. Funding to run elections, which traditionally flows from states to counties to individual precincts, has dwindled over time.

(continued on p. 21)



# At the Intersection of Climate Change and Housing

INTERVIEW WITH ZOE MIDDLETON

*The country's housing crisis is well documented: for myriad historical, economic, geographic, and social reasons, there are not enough affordable homes available in the places where people work, study, and want to live. According to the National Low-Income Housing Coalition, there is a nationwide shortage of 7.3 million affordable rental homes. Intersect this with the climate crisis, and study after study shows that swaths of US housing are vulnerable and at risk of being uninhabitable.*

*Advocates today, including UCS Associate Director for Just Climate Resilience Policy Zoe Middleton, are pushing for solutions from the federal to the local level that are informed by the climate crisis and designed with justice in mind.*

***Often the first image that comes to mind when one thinks of climate change and housing is of expensive coastal real estate slipping into the ocean thanks to sea level rise. In addition to people with beachside property, whose homes are directly affected by climate change?***

**ZOE MIDDLETON:** Whether it's wildfires, hurricanes, or sea level rise, threats to our housing stock are increasing in frequency and severity due to climate change. Extreme weather is taking housing offline in both rural and urban areas, and it's affecting both homeowners and renters.

**ZOE MIDDLETON** is the associate director for just climate resilience policy at the Union of Concerned Scientists. She has worked with climate, housing, and environmental justice nonprofits and coalitions to define priorities, develop and execute impactful communications and research-to-action plans, troubleshoot organizing strategy, and craft policy platforms.

Developers of luxury properties may still find it profitable to rebuild in high-risk areas, but in the context of a severe national shortage of affordable housing, what is concerning is how many low- to moderate-income families struggle to recover after their homes are damaged in climate change-fueled disasters.

While there are decent data on the number of housing units lost to extreme weather, it's harder to quantify how many units are left standing but with massive habitability defects like mold, impacts to electrical systems, and smoke damage. Renters, who are more cost-burdened than ever due to a combination of high housing and energy costs, frequently feel trapped in substandard conditions post-disaster. We saw this after Hurricane Katrina and we still see it now.

***Climate resilience is the idea that we need to simultaneously cope with and manage the impacts of climate change while preventing those impacts from growing worse. What would it take to make the country's housing stock more climate resilient?***

**ZOE MIDDLETON:** What resilience looks like for housing depends on the

hazards a community faces. In the case of flooding, design interventions like elevation, [stormwater-absorbing] bioswales, and other forms of floodproofing have been shown to reduce risk and maintain the habitability of a building.

On the local level, climate-informed building codes along with proactive inspection and code enforcement could improve existing homes. Changes to permitting regulations and processes could speed up development, while creative local financing such as bonds or payroll taxes for large corporations could subsidize housing investments. States could also take broad action to build and weatherize housing by expanding existing programs or changing restrictive, exclusionary zoning that drastically limits options and increases costs.

In places where it's possible to mitigate the effects of climate change through infrastructure projects, those investments should be made and maintained with priority given to the communities most at risk. And any local or state action would be bolstered by federal legislation that both helps finance resilient affordable housing and strengthens renters' rights nationwide.

***Do the insurance industry and private businesses have a role to play in creating more climate-resilient housing?***

**ZOE MIDDLETON:** Yes, they do. The insurance industry needs to be reimaged. Lots of existing affordable housing is poorly weatherized and vulnerable to climate hazards. Increased risk due to climate change has caused premiums to increase and insurers to pull out of some markets. This has made it harder to build much-needed new housing or retrofit existing housing.

***The cruel irony is that while people on the front lines of climate change struggle to insure their homes, fossil fuel projects that drive emissions and extreme weather are still being insured.***

In order for Congress and state regulators to address this challenge they need a fuller understanding of the problem. The insurance industry needs to lift the veil on how they are evaluating risks and who is being denied coverage.

Of course, the cruel irony is that while people in communities on the front lines of climate change struggle to insure their homes or find affordable housing, fossil fuel projects that drive emissions and extreme weather are still being insured. Continued insurance of fossil fuel projects puts us all at risk. It's up to both elected officials and the insurance industry to champion climate adaptation and accelerate an energy transition that reduces risk for all of us.

***How does public housing fit into all this?***

**ZOE MIDDLETON:** Public housing is an essential source of affordable housing for 1.6 million extremely low-income Americans. Maintenance of public housing has not been sufficiently invested in and now climate change presents new costs and challenges.

A recent UCS analysis found that public housing is one of the most at-risk types of infrastructure for increased flooding due to sea level rise in the coming decades. Public housing residents are also at risk of extreme heat exposure, since decades-old buildings were built for a cooler climate and local housing authorities are not required to provide air conditioning.

While the Inflation Reduction Act provided some funding for making public and other affordable housing more climate resilient, public housing authorities may struggle to successfully apply for funds.

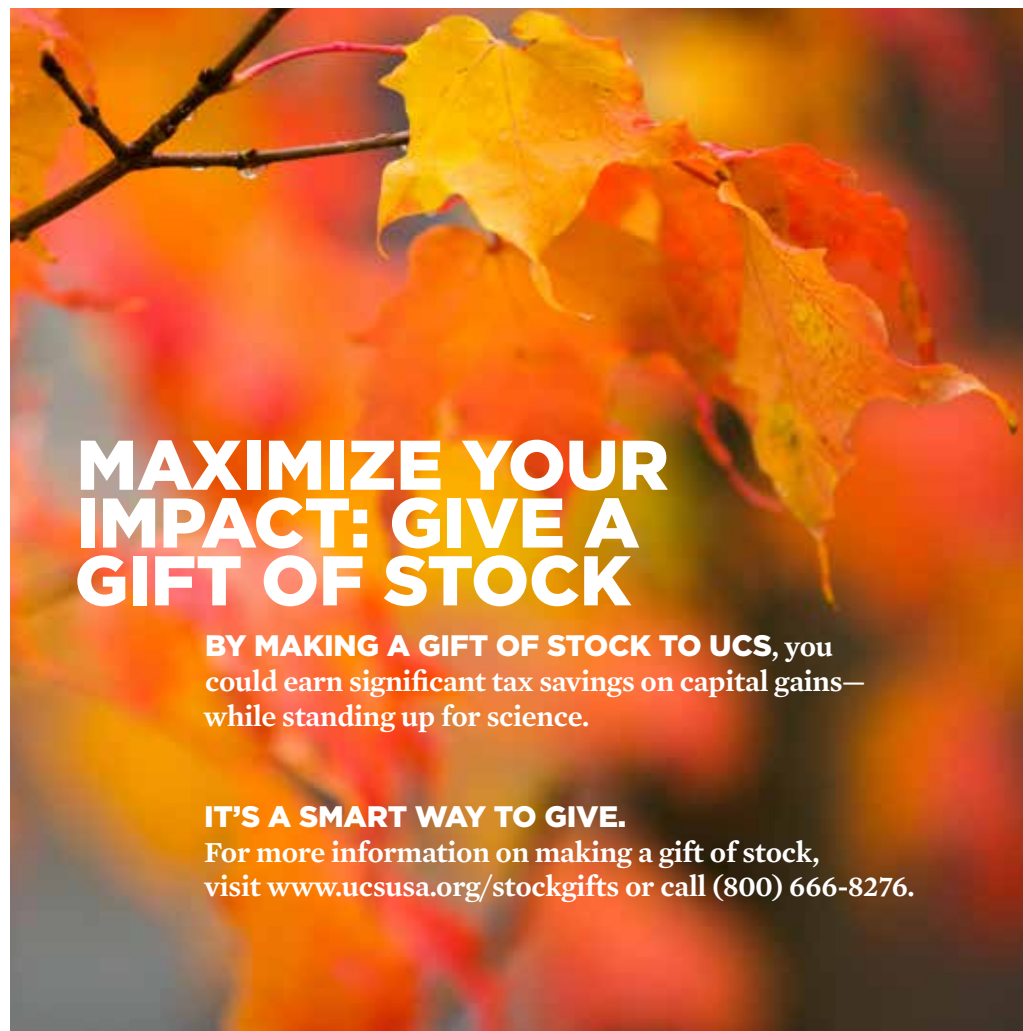
***What can be done at the federal level to make sure housing policy and funding decisions are science-based, equitable, and just?***

**ZOE MIDDLETON:** Both the social and physical sciences can help policymakers understand the origins of the current housing crisis and the growing risks posed by extreme weather and a changing climate. Science also can help policymakers avoid expensive and dangerous decisions.

As advocates and legislators ramp up their response to the housing

and climate crisis, they must take their cues from the low-income renters, homeowners, and disaster survivors who understand the brokenness of our current system. Early attempts at this are under way with the inclusion of tenant leaders on a Federal Housing Finance Agency subcommittee on affordable housing and support for community-led climate relocation work via the Inflation Reduction Act. {C}

***This interview was edited for length and clarity.***




## **MAXIMIZE YOUR IMPACT: GIVE A GIFT OF STOCK**

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# ADDING CAR-



# UP THE COSTS OF A CENTRIC LIFE

*For many people, the US transportation system leaves little choice but to drive. Offering more options would be a win for the climate, public health, and justice.*

BY CLAUDIA WARD-DE LEÓN

I live in rural New England, a place where driving a car is my only option if I need to get to a doctor, a specialty store like a hardware or sporting goods shop, or to visit friends or family. A new report from the Union of Concerned Scientists, *Freedom to Move: Investing in Transportation Choices for a Clean, Prosperous, and Just Future*, finds that this status quo, this dependence on personal vehicles in towns like mine across the United States, is inequitable and expensive, and that inaction is not only costly for our wallets, but also for our bodies and our planet.

Were we to transform our current transportation system to one that prioritizes people instead of highways, could that have a positive impact on climate change, access to transit for all, and economic opportunity? The new analysis examines those questions.

Our results show that moving away from the United States' outdated transportation system to one with more alternatives to driving could reap enormous benefits: over the next 25 years, the nation could meet its climate targets while saving up to \$201 billion in reduced energy infrastructure costs, \$355 billion in reduced spending on gasoline, and \$128 billion in reduced health costs, as well as thousands of lives saved due to better air quality. In addition, we found that creating more alternatives to driving would allow the country to reach net-zero heat-trapping emissions by 2050 more efficiently, while also making it easier for everyone to get around.

Kevin Shen, a transportation policy analyst and advocate at UCS and co-author of the report, says, "We cannot make progress on mitigating climate change without a transformation in the way we get around. That means expanding public transit options and making it more convenient and safer to navigate our communities by biking, walking, or rolling, a term that includes using wheelchairs, strollers, scooters, and more. This is in addition to making vehicle charging more accessible at home, work, and across communities so more of us can confidently switch to electric vehicles."

*We cannot build our way out of the mess that is transportation in this country by laying more asphalt. We need a transformation in the way we move people and goods around the country.*

The report findings and Shen's words ring true for me and my personal experience with transportation. I've spent time living in both transit deserts and in places where an abundance of transportation options were right outside my door.

#### **BIG CITIES AND SMALL TOWNS BOTH HAVE NEEDS**

Boarding the bus with my grandmother for a trip to the market is one of my earliest memories. I remember the rising sun illu-

minating her faded coin purse, the metallic sound of the coins as she fished for the right fare. The smell of freshly laundered clothes and aftershave drifting through the aisles of the bus, and the rumbling of the bus as the driver shifted to a different gear. We didn't ride another bus together for nearly a decade; I emigrated to the United States, and she remained in Central America. For the bulk of my childhood and teenage years I got around in cars.

That's because the US suburbs where I grew up lacked reliable public transportation. When I moved to Boston in my 20s, I sold my car within the first few weeks of moving and was blissfully car-free for about 10 years. Within the first year, I had my preferred bus route for getting home. I knew which subway station was closest to each touristy spot when I had out-of-town visitors, and I knew what time the last train left so I could get home on the cheap from a Saturday night out with friends. I had become one of the freshly laundered workers who relied on transit to get me to and from work every day.

Then the pandemic upended life.



I moved away from Boston and its high rents to a more rural area with greater access to green space. Today, as a remote worker, I am fortunate enough to not have far to go within a given week. The decisionmakers tasked with town planning had the foresight to create a town center where a grocery store, post office, library, movie theater, family-owned hardware store, and a handful of coffee shops and restaurants are all within a 10-minute walk from home. Unfortunately, this kind of intentional planning isn't the case for many rural towns, where access to a car and the ability to drive are a lifeline to groceries, health care, and social contact. And despite the great planning and a regional bus line with a handful of in-town stops every hour, I'm sad to report my car-free days have come to an end: the bus cannot get me to all the places I need to go.

Looking back at all those subway and bus rides and additional miles I logged on my bike and on foot in my 20s and 30s is an interesting exercise, both from a financial perspective and from a climate activism perspective. Not only was I able to save money normally spent on insurance, parking, and maintenance (about \$12,000 annually in today's dollars, according to the Bureau of Transportation Statistics), but in just one year of using public transportation to get to and from work, I avoided nearly 2,400 miles of driving. In 10 years: 24,000 miles. Multiply that by all the commuters I shared a train with, and the numbers are truly impactful.

Yes, there were bus delays and broken air conditioners on subway cars that made some commutes sticky and uncomfortable, but the multitude of urban transportation choices helped make my car-free life work. I always got to where I needed, saved money, and lowered my personal share of heat-trapping emissions.

In light of the UCS findings, I think about what would happen if Boston and other US cities invested even more in transit? What would public health outcomes be for predominantly Black and Brown communities if their schools, homes, and playgrounds were no longer next to smoggy, noisy highways? How would the lives of those of us living in rural areas change if we had more expansive bus service, convenient and thriving Main Streets, and our shuttered rail stations once again became viable links to important destinations? What if every public library, truck stop, shopping center, and parking garage had a bank of high-speed electric vehicle chargers?

### MOVING BEYOND THE FREEWAY

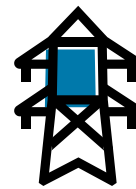
"The way we transport people and goods is unsustainable. We cannot build our way out of the mess that is transportation in this country by laying more asphalt," says Shen. He and co-author David Cooke, senior vehicles analyst at UCS, found that the huge investments the United States has made in expanding highways have *increased* traffic and transportation-related pollution, to the benefit of the oil and auto industries—all while leaving few options for communities and non-drivers other than car ownership and its expensive costs.

"The good news is the technology is already available to lower the heat-trapping emissions produced by moving people and goods across the country. We know what we need to do," says Shen.

## LESS DRIVING, MORE BENEFITS FOR PEOPLE AND THE PLANET



**25%**  
reduction in electricity demand from transportation (2050)



**\$201 billion**  
savings in energy infrastructure (2025–2050)



**131 billion**  
gallons of avoided gasoline consumption (2025–2050)



**\$355 billion**  
in household gasoline savings (2025–2050)



**\$63 billion–\$128 billion**  
public health benefits from improved air quality (2025–2050)



**4,500–9,000**  
lives saved (2025–2050)

Transportation is one of the areas where the right policies, infrastructure, and individual choices can make a significant impact on climate change, not to mention the impact they can make on improving livelihoods and lives—including health outcomes. For someone like me who has lived in both rural and urban areas and who has experienced both an abundance and a dearth of transportation options, it is clear that we need to act now to make sure decisionmakers put climate and equity considerations at the heart of transportation policy and infrastructure decisions.

Read more about how UCS is contributing to the transformation of our transportation system at <https://act.ucsusa.org/fall24-mobility>. {C}

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



# How to Keep the Power On during Extreme Weather

By Kate Esbenshade



*A utility crew in Houston, Texas, works to restore power lines in the wake of Hurricane Beryl in July 2024. The storm knocked out power for two million people during a deadly heat wave.*

When Hurricane Beryl ripped through the Houston area this summer, the power outages it created were just as deadly as the storm itself, with 7 of 14 fatalities attributed to heat exposure due to power loss. Our changing climate is causing more extreme weather conditions like this that affect human lives and our power grid.

Data from recent decades show 80 percent of all major power outages in the United States are due to extreme weather such as hurricanes, high winds, ice storms, wildfires, and heat. Power failures can happen at any point in the process of power generation and transmission. But problems with the distribution system that brings energy into our homes—often thin power lines connected by wooden poles that are both vulnerable to extreme weather—are the most common cause of power outages.

High winds and ice buildup can damage the poles and wires directly, or through falling trees and branches. Heat can reduce the efficiency and capacity of power lines, and heat and increased current due to demand for air conditioning can also cause lines to sag and touch vegetation, potentially leading to short circuits, fires, and blackouts.

Utilities may not be able to prevent all outages due to weather. But there are many ways that local electricity grids can be made more resilient as extreme weather becomes more common because of climate change.

## STRENGTHENING AND UPDATING PHYSICAL COMPONENTS

The first set of solutions for grid resilience is to increase the durability of components including poles, wires, and

transformers. Replacing wooden poles with steel or steel-reinforced cement can reduce the chance of poles snapping or being burned by wildfires. Using extra insulation on the lines can provide protection from contact with objects (e.g., vegetation, birds), thereby decreasing the risk of electrical faults and sparks that can cause wildfires.

Pruning or removing trees near power lines—a less expensive, but also less permanent option—can also prevent outages. Burying (or “undergrounding”) the wires can make them less vulnerable to outages, but this practice is expensive. While undergrounding works well in high-density areas, or in places with frequent strong winds, it also increases the risk of lines corroding from flooding or saltwater intrusion. And it makes them more difficult to maintain and repair, thus extending the time of an outage.

## PREVENTING OUTAGES AT THE GRID LEVEL

A second set of solutions involves setting up power grids so that if a component does fail, or there is an outage in one area, it does not cascade into a larger failure. Microgrids and grid “islanding” can be part of this solution.

A microgrid is a self-contained power system with its own electricity generation, distribution, and customers. Even when they are connected to larger grids, microgrids can maintain some functionality during an outage on the larger grid. “Islanding” is the ability of a microgrid to be disconnected from the larger grid while continuing to provide power to the microgrid’s customers. Instead of dealing with a cascading power failure, islanding gives utilities the opportunity to prepare for and manage outages so that fewer customers are affected. In addition



to enhancing resilience, because they increasingly use solar energy paired with energy storage, microgrids also serve as a means for increasing renewable energy on the grid, supporting a reduction in carbon emissions while potentially reducing energy costs.

An obvious but still not universally adopted solution is for utilities to use technology to track what is happening on the grid in real time. One example is advanced metering infrastructure (AMI), a system allowing two-way communication between utilities and consumers with predictive and real-time sensors. This lets grid operators know where and when there are outages, so they can plan for where an outage may occur next. Combining AMI with the ability to use microgrids can isolate any damaged equipment, limiting the impact on customers. A study on Hurricane Irma, which hit Florida in 2017, estimated that areas with AMI had 112 million fewer “customer hours” of lost power (the number of

*Renewable energy and energy storage are key components of microgrids that can help keep power running during outages, while advanced metering technology can help utilities better pinpoint where outages occur so electricity can be restored more quickly.*

affected customers times number of hours of blackout) than those that did not.

#### WHAT'S NEXT?

These solutions—replacing wooden poles, trimming trees, burying wires, adding microgrids, and using technology to track outages—can increase resilience in the face of extreme weather. The costs and damages of power outages are high and adding resilience measures can decrease this risk. Investing in these smart solutions is necessary for the success of our transition to clean energy, but the costs of doing so must not fall inequitably on low-income ratepayers and communities.

Enhancing resilience is not happening everywhere, but when states pass laws

or take regulatory actions that require utility companies to assess and increase the resilience of their grid operations, that can have a broader impact. More utilities are putting such preventative measures into place; hopefully this will continue until we have a power grid that minimizes outages and prioritizes safety for everyone. {C}

*Kate Esbenshade is a former 2024 Schneider Sustainable Energy Fellow with the UCS Climate and Energy Program, where she researched weather-related challenges to power transmission and distribution. She is a senior at Stanford University majoring in Earth systems.*





## What We Need to Thrive: Greater Access to Opportunity

(continued from p. 2)

When it comes to climate change, better transportation options also, importantly, allow society to *do less*. Electric vehicles, from passenger cars to heavy-duty freight trucks, are essential to a decarbonized system. But investments in the things that allow us to *drive less*, like buses and bike lanes, mean less climate pollution from gasoline-burning vehicles, and fewer resources needed for the grid to power electric vehicles.

In this issue, you'll learn about a new UCS report that quantifies the benefits of a transportation system that enables fewer people to drive (see p. 14). Such a system would collectively save us hundreds of billions of dollars, allowing us to achieve the clean energy transition more affordably, while also improving our health and expanding our freedom to access what we need.

Looking again at those maps of the inequity imposed on Houston voters who rely on public transit has also reminded me of the intimate connections that exist between all the issues we work on at UCS. The challenge of climate change demands we transform our transportation networks. Expanding transpor-

tation access benefits civic and democratic engagement. And a healthy democracy enables us to make decisions that make our food systems safer and the world more secure.

I encourage you to think about those connections as you read some of the other features in this issue, including a Q&A with a UCS expert on the myriad ways climate change is deepening the nation's housing crisis and the choices decisionmakers could make to alleviate the growing problem (p. 12), and a look at how UCS science is improving ballot design and calling attention to racial inequities in election administration (p. 8).

No matter what this fall's election brings, UCS will be ready to defend the science-based policies we need and the scientists and policymakers who will carry them out. Thank you so much for your support—we truly cannot do this important work without you. {C}

**Steven Higashide** is director of the UCS Clean Transportation Program. Read more from Steven on our blog, *The Equation*, at <https://blog.ucsusa.org>.



*There's a lot of room for improvement, and a role for science and evidence-based policies in making voting equity happen.*

## How to Science Our Way to a Healthier Democracy

*(continued from p. 11)*

Another part of the problem is the patchwork nature of election laws in the United States. "It's hard to set good standards when you're so decentralized," says Gordon-Rogers. As one example, she brings up the practice of ballot curing in her home state of Pennsylvania. If a ballot is filled out incorrectly, in many states, a voter can "cure," or fix an error such as a missing signature, for their vote to count after Election Day.

"We don't have any ballot curing policy in our state election code in Pennsylvania," she says. "It's at the discretion of the precinct and county whether a voter who makes a mistake can fix it. So, there's been a lot of back-and-forth in courts about what errors on ballots should be eligible for curing and what shouldn't."

### SCIENCE IN SERVICE OF DEMOCRACY

There's a lot of room for improvement, and a role for science and evidence-based policies in making voting equity happen. To that end, Gordon-Rogers and her team are now working on an analysis of data from presidential elections since 2016, which will include data from this year. They've also released an analysis of how to make ballots easier for voters to under-

stand and correctly fill out (see the sidebar on p. 11). In 2025, UCS will turn its attention to advocacy, working in partnership with community organizations to help local and state election administrators implement our recommendations.

"There are real opportunities for folks with scientific and analytical expertise to be useful in this field," says Berger. "For our part, we'll be recommending new science-informed election policies: for data transparency, for equitable ballot design, for fair legislative maps. This is how UCS can help protect our democracy."

Gordon-Rogers is looking forward to seeing her work translate into advocacy.

"There's research, and then there's doing something with all that research. Most scientists never get to be involved in the latter. But now I've been at the table with Election Science Task Force members, some of whom work in these pivotal counties, learning from their points of view. As a scientist with a background in academia, it's amazing to have these opportunities with UCS." {C}

*Pamela Worth is senior writing manager at UCS.*

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# Science Faces a State of Emergency



## A MESSAGE FROM JULIA KENT

CHIEF DEVELOPMENT OFFICER

Regardless of what happens in the 2024 elections, science is in a state of emergency.

When the Supreme Court struck down the “Chevron doctrine” in June, it changed the longstanding practice of courts deferring to subject matter experts at federal agencies on the implementation and enforcement of laws and regulations. Now, policies and safeguards regarding climate, finance, health, labor, technology, and more can be decided by the whims and ideological preferences of unelected judges, instead of the best available scientific evidence.

The far-right manifesto Project 2025 calls for the elimination of multiple energy- and environment-related government offices—and “to eliminate climate change references from absolutely everywhere.” Meanwhile, some states are putting anti-science and inhumane policies into place, such as making it illegal to provide outdoor workers with protections from deadly extreme heat.

Nevertheless, with our unique blend of science and advocacy to push forward evidence-based decisionmaking, no organization is better positioned to tackle global crises and defend science than the Union of Concerned Scientists.

As the Chief Development Officer for UCS, I’m pleased to share an opportunity to harness the power of science to create a safer, healthier, and more just world—and to defend science when

it’s under attack: we’ve launched the **Science Emergency Fund**, dedicated to advancing our most urgent and highest-priority work.

### HOW YOUR CONTRIBUTIONS WILL HELP

Whatever happens next politically, our work is more urgent than ever, and millions of lives and livelihoods are at risk. We must tackle climate change head on, speed an equitable and just transition to renewable energy, electrify our transportation system, and hold fossil fuel companies accountable for the damage they have done. And we must restore our democracy, championing fair voting practices and combating rampant disinformation.

UCS has proven repeatedly that we can operate effectively regardless of who’s in office. But in the coming months, our boldest plans are at risk of falling short without more funding.

Your generous contribution to the Science Emergency Fund will help us:

- Expose political attacks on science, mobilize and expand the UCS Science Network, and pass the Scientific Integrity Act to protect federal scientists from political interference

- Slash climate change emissions by speeding the growth of renewable energy and clean transportation, ensuring equitable, sustainable solutions for all communities
- Restore our democracy and protect free and fair elections, using the best available science to fortify local, state, and federal elections.
- Make polluters pay by providing the scientific evidence to hold fossil fuel companies accountable for disinformation, fraud, and their contributions to climate change

Like any emergency fund, our Science Emergency Fund is intended to shore up resources for unpredictable times. That’s why we’re setting aside 100 percent of every dollar raised for the fund to advance our most urgent programs and initiatives, no matter what happens in the months ahead.

As a UCS supporter, you understand exactly what we’re fighting for, and what we’re up against. Thank you for the work you make possible, and for helping us meet these challenges. {C}

Please make a contribution today at [www.ucsusa.org/EmergencyFund](http://www.ucsusa.org/EmergencyFund).





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