Union of Concerned Scientists

50 YEARS of SCIENCE and ACTION

Catalyst

Volume 19, Summer 2019

Killer Heat

New UCS Report Shows What to Expect Near You

The Next 50 Years: UCS Looks Ahead

Keeping the Science in the US Dietary Guidelines

[Union of Concerned Scientists

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

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ON THE COVER:
A woman crosses railroad tracks in Phoenix, Arizona, where a heat wave drove temperatures above 110°F. Climate change will bring more dangerously hot days to cities across the country; learn more on p. 8.

Faith and Science: Powerful Partners for Change

By Ken Kimmell

This spring, I embarked on a "faith and science" tour, in conjunction with a group I greatly admire: Interfaith Power & Light (IPL). IPL's president, Susan Hendershot, and I visited churches in the South to talk about how science and faith, two of the greatest forces for progress, can join together to tackle the urgent problem of climate change—with science demonstrating the urgency of the problem and identifying solutions, and faith providing a moral propeller for action. So far, we have held events in Alabama, Georgia, North Carolina, South Carolina, and Tennessee, with more envisioned for the fall.

We chose the events' locations to tap into a reservoir of activism in the faith community that can hopefully move the South to a leadership role on climate. And I enthusiastically signed on for this tour because I believe that, even in this age of computer screens and electronic conversations, showing up and talking with people in person is still the best way to reach them.

> *Even in this age of computer screens and electronic conversations, showing up and talking with people in person is still the best way to reach them.*

My experience so far has been encouraging: hundreds of people have attended these events, eagerly soaking up information, asking challenging questions, meeting with other concerned people from their communities, and heeding the call to take action. UCS is pushing hard for Congress to enact durable, bipartisan federal climate legislation as soon as possible. But we know it will likely be several years before we can realize that goal. In the meantime, this faith and science tour seeks to lay the groundwork for it by finding new partners in new locations—essential work for building a movement.

Photos: Richard Howard (Ken Kimmell); Clarisse Meyer/Unsplash (sky)

WHAT OUR MEMBERS ARE SAYING

Here's a sampling of recent feedback from the UCS Facebook page (*www.facebook.com/unionofconcernedscientists*) and Twitter feed (*www.twitter.com/ucsusa*).

ON THE MILESTONE OF MORE THAN 100 ATTACKS ON SCIENCE BY THE TRUMP ADMINISTRATION

@Slopiegal:
The health and safety of adults and children in the United States must not be left to [EPA Administrator] Wheeler and Trump. Their defunding of research and health protections to return money to the pockets of CEOs must not be allowed to continue. Congress must protect the health and safety of all Americans.

David Pedersen:
How can anyone hate science if it's (our best understanding of) the truth?

Angela Tulumello:
Thank you for this list! I've been posting all this info as it happened over the years and was getting ready to go back and compile it together for the ignorant.

ON THE BETTER MILESTONE OF SURPASSING 2 MILLION INSTALLED SOLAR PHOTOVOLTAIC (PV) SYSTEMS

Joe Connett:
Love my PVs and [electric vehicle]!

Juanita Hepler:
Just installed solar on our roof :-)

ON THE TRUMP ADMINISTRATION CALLING NATURAL GAS "FREEDOM GAS" AND "MOLECULES OF FREEDOM"

@Grady_Booch:
Given the source, it's certainly not one of the noble gases . . .

@R_McQ_:
Fake elements.

Laurel Standley:
I believe this one occurs in the Orwellian group of elements.

Kevin Wood:
Seriously? There aren't enough faces or palms for this . . .

ON REPORTS THAT THE HEAD OF THE US GEOLOGICAL SURVEY IS BARRING PROJECTIONS OF CLIMATE IMPACTS BEYOND 2040

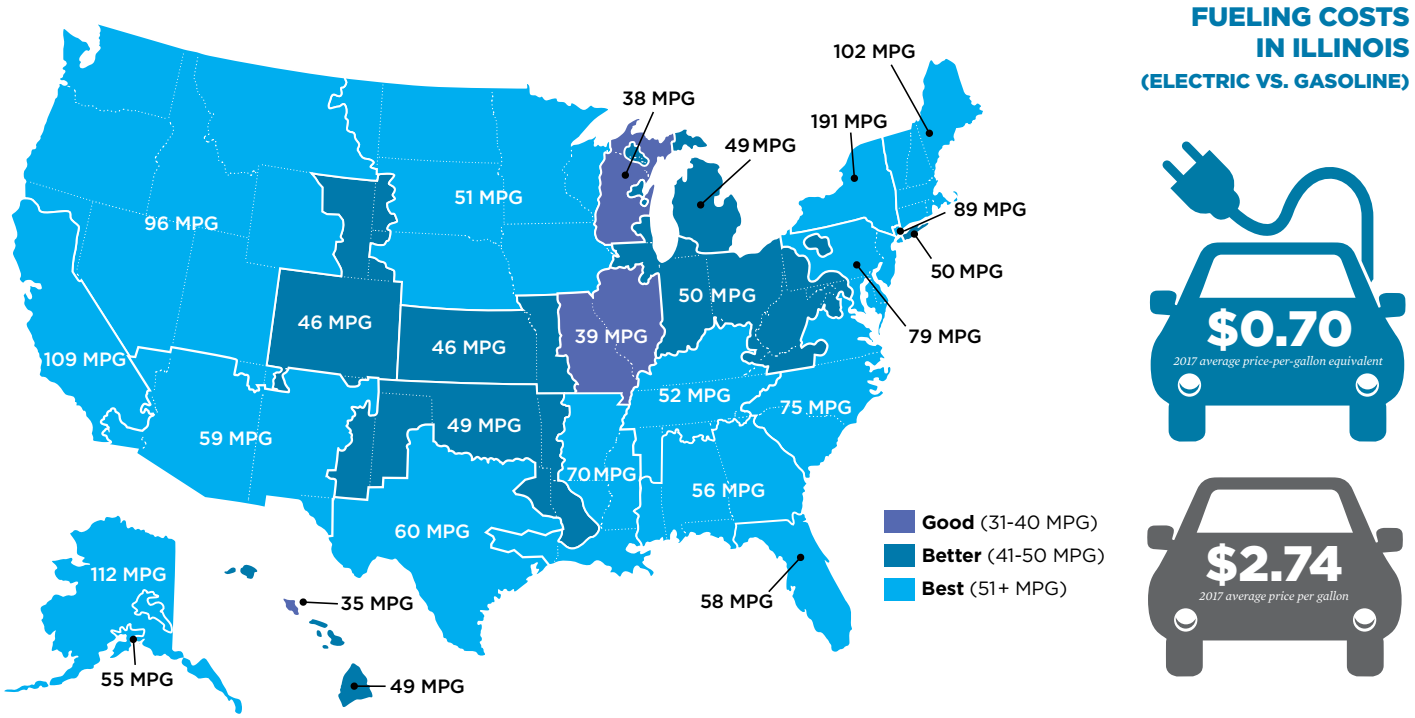
Heather Martley:
Unconscionable. Get these people out of our science-based agencies.

Nick Wagers:
Because climate projections that only go 20 years out are super-meaningful . . .

Mari Jo Clark:
We cannot wait that long. All countries need to take action NOW!

[IN THIS ISSUE]

How Much Can You Save with an Electric Vehicle? UCS Knows



EVs are not only cheaper to operate than gasoline-powered vehicles, but also much cleaner. This map illustrates the degree to which EVs reduce global warming emissions—equivalent to conventional vehicles getting 38 to 191 miles per gallon, depending on which regional electricity grid is charging the EV.

With the transportation sector now surpassing the power sector as the largest source of heat-trapping emissions in the United States, there's no question that finding cleaner means of transportation is one of the most important strategies we have to combat climate change. That's why transportation experts at the Union of Concerned Scientists stress the need to electrify the US vehicle fleet.

Climate benefits aside, you can also save a lot of money with an electric vehicle (EV). How much? UCS has crunched the numbers for 39 states so far.

Take Illinois, for example, where EV sales increased 89 percent from 2017 to 2018, reaching 22,803 sold by the end of last year. According to UCS analysis, some Chicago residents charging an EV at home in 2017 paid the equivalent of 70 cents per gallon of gasoline. What's more, UCS found that rural EV drivers in Illinois saved the most compared with gasoline vehicles. And, because EVs have fewer moving parts and don't need oil changes, EV owners around the country could save an average of $2,100 in maintenance costs over the life of the vehicle.

ENVIRONMENTAL BENEFITS: BIG AND GETTING BIGGER

Perhaps the most heartening aspect of UCS research on this topic is that EVs are getting measurably cleaner all the time as renewable sources of energy make up a significantly larger part of our electricity mix. Back in 2012, when UCS first began tracking EV emissions in different parts of the country, we found that just 45 percent of people lived in areas where driving the average EV would produce less tailpipe global warming emissions as a highly efficient conventional vehicle getting 50 miles per gallon. By 2018, that number was up to 75 percent, with EVs in many areas now emitting significantly less than even the most efficient conventional vehicles available. That's a big change in less than a decade and the trend is almost certainly accelerating.

The benefits of a widescale shift to EVs couldn't be clearer. For example, replacing 1 million 25 MPG gasoline cars with today's average EV would avoid burning some 450 million gallons of gasoline and save 3.5 million tons of global warming emissions per year. To find out more about just how clean an EV would be where you live, type in your zip code at *www.ucsusa.org/clean-vehicles/electric-vehicles/ev-emissions-tool*.

Insurance Industry Takes Note of UCS *Underwater* Report

Rachel Cleetus, second from left, discusses the costs of climate change in an expert panel at the Envision Austin conference this spring.

As part of our continuing efforts to bring UCS analysis about the threat posed by climate-driven sea level rise to a broader audience, Climate and Energy Program Policy Director Rachel Cleetus joined a panel this spring at the Envision Austin conference in Texas. The conference was hosted by AIR Worldwide, one of the leading global catastrophe modeling and risk assessment companies, and attracted a wide array of risk management professionals including many from the insurance industry.

Cleetus's well-attended panel on climate change afforded an opportunity to share our research, policy recommendations, and strategic thinking with an audience that plays an important role in the public narrative about the costs of climate change and the need for climate resilience. Along with many other topics, Cleetus discussed findings from the 2018 UCS report *Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate*, which projected that, by the end of the century, some 2.5 million US coastal homes and commercial properties currently worth more than $1 trillion could be at risk from chronic tidal flooding.

Cleetus called the attention being given to these findings a welcome development. "We're increasingly seeing representatives from the real estate, insurance, and financial sectors begin to acknowledge the risks to coastal communities from climate-driven sea level rise. The private sector can play a powerful role in calling for policies to reduce our carbon emissions and build climate resilience."

Shell Audits Trade Associations' Climate Stances

This spring, while ExxonMobil blocked shareholders from voting on proposals that would have addressed climate change, and while fossil fuel companies in general continue to drag their feet on climate action, Royal Dutch Shell published an Industry Associations Climate Review that audited the climate stances of the trade associations to which it belongs. The move follows UCS calls in our *Climate Accountability Scorecard* for fossil fuel companies to cut ties with trade associations that distort or deny climate science. (For more, *see www.ucsusa.org/global-warming.)*

Notably, as a result of the company's review, Shell pledged to pull out of an industry trade group called the American Fuel and Petrochemical Manufacturers, citing differences with the group's position on climate change. Kathy Mulvey, fossil fuel accountability campaign director at UCS, welcomed Shell's action but noted that the company should also sever ties with other associations including the American Petroleum Institute, the National Association of Manufacturers, the US Chamber of Commerce, and the Western States Petroleum Association, given their well-documented roles in spreading disinformation on climate science and efforts to block climate action.

Despite not going far enough, Mulvey says, Shell's audit of its trade associations' climate positions shines an important light on the fossil fuel industry's extensive political lobbying and policy advocacy. Already, after activists turned up the pressure, BP reportedly committed to follow suit and review its own membership in lobbying groups. As Mulvey puts it, "If other major fossil fuel companies such as Chevron, ConocoPhillips, and ExxonMobil took similar steps, these sources of disinformation would lose their funding and we would be in a much stronger position to enact the policies we urgently need to combat climate change."

Photos: Nicholas Clarke (Rachel Cleetus); Nancy Beijersbergen/Alamy Stock Photo (Shell)

Are US Farms and Farmers Prepared for a Changing Climate?

A dust storm blankets a farm in eastern Washington State. Drought and other extreme weather events—exacerbated by climate change—are already taking a toll on farms and farmworkers, and threaten the long-term prospects of US agriculture.

The future stability of the US food supply and the livelihoods of many people in rural America are at risk, as climate change threatens farmers' ability to keep growing food and other crops. A new UCS webpage and an accompanying short video show how climate change and current agricultural policies and practices can combine in disastrous ways—and how much damage could occur if we don't take action to cut heat-trapping emissions and change the way we farm.

Extreme weather—in the form of heat waves, drought, and floods—is already taking a toll on farmers, farmworkers, crops, and livestock, and is projected to intensify in the years ahead. In addition, changing growing seasons and higher winter temperatures can lead to unpredictable results for crops and encourage the migration of pests that can harm yields. Compounding matters is the fact that shortsighted public policies incentivize common agricultural practices (such as the overuse of chemical fertilizers, lack of biodiversity in planting, and frequent plowing) that intensify the risk of catastrophic outcomes in a warming world.

The new UCS webpage recommends immediate steps farmers and policymakers can take to address these threats, including:

- Building healthier, "spongier" soils by planting cover crops and deep-rooted perennials that increase soil's capacity to soak up heavy rainfall and hold water for dry periods
- Redesigning farms as diverse ecosystems, incorporating trees and native perennials, reducing dependence on fertilizers and pesticides, and reintegrating crops and livestock
- Developing new crop varieties, livestock breeds, and farm practices specifically designed to help farmers adapt to evolving climate realities

By creating policies to support these science-based and field-tested solutions, and reducing emissions to limit climate-related damages, state and federal policymakers can help protect farms and farmers, while building a more sustainable, just, and resilient agricultural system. Learn more at *www.ucsusa.org/climate-ag* and listen to the *Got Science?* podcast interview with Senior Scientist Marcia DeLonge at *www.ucsusa.org/ep60-delonge*.

Photos: USDA/Courtesy of Susan DeWald (farm); Anthony Eyring/UCS (Hiroshima); Office of Senator Markey (Congress); Ales Krivec/Unsplash (ad)

Voices from Hiroshima Resonate in UCS Video

What was it like to experience the nuclear explosion in Hiroshima? What does nuclear activism look like today? And is the Japanese government helping or hurting global efforts to reduce the risk of nuclear weapons? A new UCS video titled "The Pain and Politics of Hiroshima"—filmed in the Japanese city during last year's commemoration of the 1945 bombing—explores these questions, weaving the lessons of the past into today's efforts to prevent the spread and potential use of nuclear weapons. You can watch the short documentary, featuring UCS Senior Analyst Gregory Kulacki (who spoke at the opening ceremonies of the commemoration), at *http://youtu.be/XavZCl6SSjM*.

Gregory Kulacki, right, participates in the Paper Crane Peace March, an event held around the anniversary of the Hiroshima bombing.

UCS Finds Climate Allies in Congress

In June, UCS experts on climate change and scientific integrity were invited to talk with senators on the Senate Climate Change Task Force about the Trump administration's attempts to suppress and distort climate science—and what can be done to stop it. We hope to continue this dialogue and build broad congressional support for strong, science-based climate policies.

Pictured above, from left to right, are Astrid Caldas, UCS senior climate scientist; Gretchen Goldman, research director in the Center for Science and Democracy at UCS; Senator Ed Markey; Lexi Shultz, vice president of public affairs at the American Geophysical Union and former legislative director in the UCS Climate and Energy Program; and Rush Holt, CEO of the American Association for the Advancement of Science and former member of Congress. Read more from Astrid and Gretchen on p. 14.

KILLER HEAT

DANGEROUSLY HOT DAYS AHEAD

New UCS analysis shows that reducing emissions now can help avoid the worst increases in extreme heat where you live.

BY PAMELA WORTH

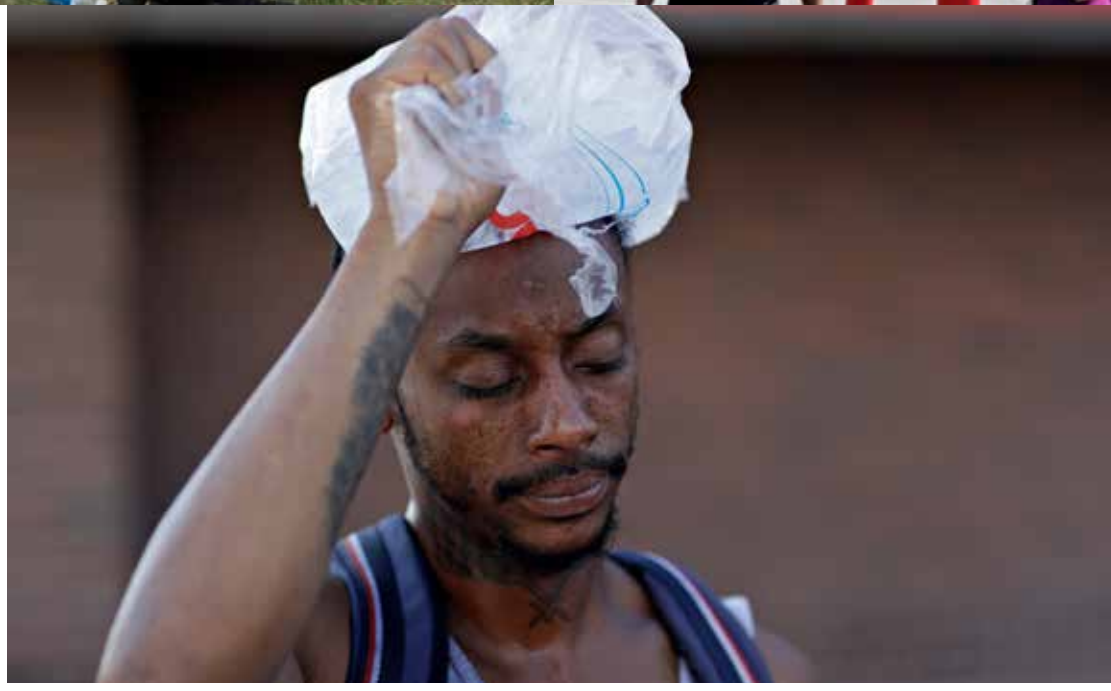
Last July, on a trip to visit friends in Montreal, my partner and I arrived to find the city in the midst of a sweltering heat wave. The apartment we stayed in, like many homes in the city, didn't have air conditioning and the 100-degree heat made it stifling inside even with windows wide open. When we returned from dinner, hours after the sun had set, the heat still hadn't broken. If anything, it felt hotter.

I've experienced many hot, humid summers along the eastern seaboard. I've even lived in Trinidad, about 10 degrees north of the equator. But until that night, I had never been so hot that I couldn't sleep. I had never been so hot that the visceral chill of a freezing-cold shower wore off in seconds. I'd never thought I could be so hot—in Canada, of all places.

The heat wave broke the next day, and I felt only relief, until I saw a startling headline in a newspaper: in Montreal and the surrounding province, the extreme heat had killed 70 people. The city morgue couldn't accommodate all the bodies.

As some of the more immediate and dramatic consequences of climate change brought on by burning fossil fuels become increasingly visible—like wild storms, rising seas, and raging wildfires—they draw our attention. But extreme heat is the deadliest weather hazard we face, killing more people in the United States each year than hurricanes, floods, lightning strikes, tornadoes, or even frigid cold.

Photo: AP Photo/Charlie Riedel



As heat-trapping emissions continue to rise, there will be fewer refuges from dangerously high temperatures, according to new research from the Union of the Concerned Scientists. *Killer Heat in the United States: Climate Choices and the Future of Dangerously Hot Days*, a report released this July, projects the frequency and intensity of the heat we can expect over the rest of this century. The findings point to a dramatic increase in lethal heat across the country, and troubling outcomes for public health. While some populations are more vulnerable to heat—including both elderly people and young children (whose bodies are less capable of regulating heat), outdoor workers, and people who either don't have air conditioning or can't afford to keep theirs on—*everyone* is susceptible to serious heat-related illnesses above certain thresholds. "Extreme heat will likely affect more Americans in more locations, over more of their lives, than any other consequence of climate change," says Kristina Dahl, senior climate scientist at UCS and lead author of the report. "Within the next 30 years, many people in the United States will be faced with heat unlike any they've felt before."

If we remain on our current path of emissions, Dahl says, hazardously hot days will increase steeply in frequency and severity in just the next few decades, threatening the health, lives, and livelihoods of many millions of people. Such heat will likely make droughts and wildfires more severe, threaten our ecosystems, cause crops to fail, and reduce the reliability of the infrastructure we depend on.

Photos (clockwise from top left): AP Photo/Richmond Times-Dispatch, P. Kevin Morley; AP Photo/Richard Vogel; David McNew/Getty Images; AP Photo/John Locher

> *Many of us have never felt off-the-charts heat, but many more of us will be exposed in the coming years.*

WHAT IS "OFF-THE-CHARTS" HEAT?

We use this term to describe conditions for which a heat index cannot be calculated using the current National Weather Service formulas. Those formulas were designed to capture all but the most extreme heat people have typically experienced, and they top out at or above a heat index of 127°F, depending on the particular combination of temperature and humidity. Our modeling reported conditions higher than these values.

As climate change drives conditions to new extremes, we will increasingly find ourselves above the top range of heat index values the NWS reports, which the agency already characterizes as extremely dangerous. Prolonged exposure to these extremely dangerous conditions can lead to illness or death. A heat index that is "off the charts," or above that extremely dangerous range, is presumably more lethal, although few medical studies exist.

"OFF-THE-CHARTS" HEAT

Dahl and her team projected future extreme heat using the heat index, or "feels-like" temperature, established by the National Weather Service (NWS). Heat index factors in not only thermometer readings but also humidity, which can make it feel much hotter. The NWS uses the heat index to issue public alerts about the likelihood of heat-related illnesses or death as those values climb. Alerts vary by region—because extreme heat affects people differently depending on whether they are regularly exposed to hot weather—but are generally issued when the heat index is forecast to rise above 100°F or 105°F for 48 hours or more.

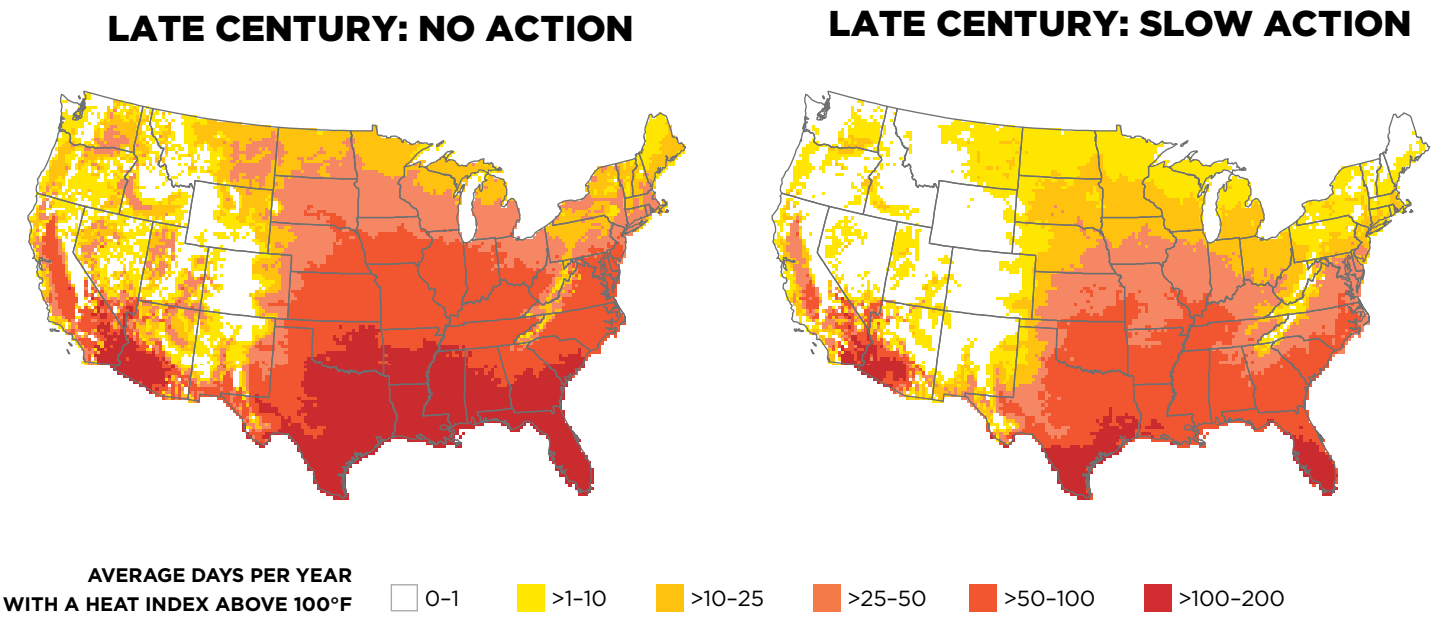
To show how many more days would hit those high "feels-like" temperatures, the *Killer Heat* team compared historic averages from the period 1971–2000 with projected heat index values in the middle and end of this century. Alarmingly, the team's projections soon bumped up against the limits of the NWS heat index formula, which is capable of calculating a value for 99 percent of current summertime conditions. The analysis found that as climate change intensifies extreme heat, the numbers will often rise beyond the calculable range—or quite literally off the charts (see the box). The UCS team accounted for these off-the-charts days as well.

"Many of us have never felt off-the-charts heat," Dahl says. "The Sonoran Desert near the Mexican border is the only place in the United States right now where people experience maybe two days like that in an average year. But many more of us will be exposed in the coming years."

Because the choices we make today will affect the frequency and intensity of future extreme heat, Dahl and her team ran models for three possible futures: one in which we allow emissions to keep rising, one in which we start taking moderate action to reduce emissions starting around 2050, and one in which we act decisively on emissions to limit future warming to 2°C above pre-industrial levels. The differences among these scenarios show clearly that our failure to act will lead to a dangerously hot future, while quickly and drastically reducing emissions can spare millions of people from deadly increases in summer heat.

"It's literally a matter of degrees," says Dahl. "Every tenth of a degree we can avoid adding globally will make a difference."

THE FREQUENCY OF EXTREME HEAT BY LATE CENTURY DEPENDS ON THE



The emissions choices we make in the coming decades will profoundly shape the frequency and severity of extreme heat later this century. If we take rapid action to half as many days with a heat index above 100°F in late century as it would with no action at all.

THE CONSEQUENCES OF INACTION

Using the historical baseline of 1971–2000, Dahl's team projects that with no action to reduce heat-trapping emissions, there will be twice as many days in an average year with a heat index over 100°F, and four times the number of days over 105°F, by midcentury. More than one-third of the contiguous United States by area will experience off-the-charts heat. And whereas fewer than 900,000 people in the United States currently endure 30 days or more with a heat index above 105°F in an average year, 91.9 million people—or about a third of the current population—will have to adapt to those conditions within the next few decades.

By late century, the numbers are even more stark. On average, there will be four times the number of days per year with a heat index above 100°F, and eight times as many above 105°F. At least once each year, off-the-charts heat will affect more than 60 percent of the contiguous United States by area. Nearly 300 urban areas will endure 30 or more days per year with a heat index above 105°F.

WHAT TO EXPECT WHERE YOU LIVE

Extreme heat will affect different regions in different ways. Some states where residents are currently unaccustomed to extreme heat—including those in New England, the Midwest, and the Pacific Northwest—may not have the infrastructure needed to keep people safe during ever more frequent extreme heat conditions. And residents of states such as Florida, Louisiana, and Texas, who are used to weeks of heat indices above 105°F, will have to adapt to months and months of such extremes. Some states are likely to experience heat so extreme and frequent that they may see an exodus of residents.

To find the team's heat index projections for your location, go to *www.ucsusa.org/killer-heat*. You'll be able to see how many days your region is expected to endure heat indices above 90°F, 100°F, and 105°F—or conditions that are off the charts. You'll also be able to see how dramatically reducing emissions can avoid the worst outcomes.

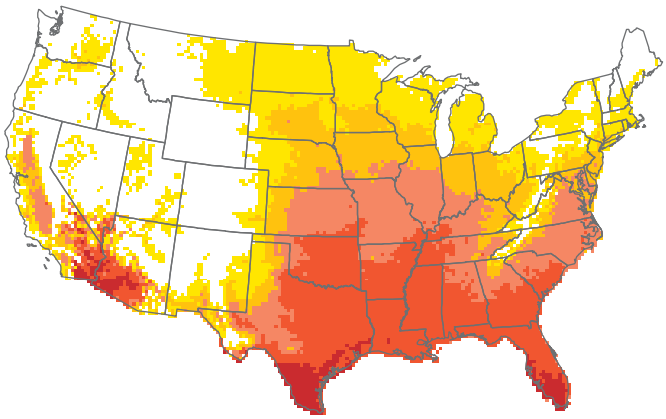
As Dahl notes, the differences among outcomes show up most clearly in the end-of-century results (see the maps above). While even aggressive emissions reductions cannot fully prevent temperatures from rising, they can help to stabilize temperatures in the years ahead.

"We don't have long to act, but we still do have a choice," she says. (See the box for ways to take action.) "I think of it in terms of my kids: this warmer world isn't what I would have wanted for them. But we can still make it manageable for them to live their lives. Or we can force them—their generation and the ones to come—to live in a world where simply going outside in the summer will be unacceptably dangerous." {C}

Photo: Dennis Otlink/Unsplash (ad)

CHOICES WE MAKE

LATE CENTURY: RAPID ACTION



reduce global emissions, the contiguous United States would experience about

HOW YOU CAN FIGHT BACK

We don't have to stand by while emissions and temperatures rise. Call, email, or meet with your legislators and urge them to:

- Support global climate action, including US participation in the Paris climate agreement
- Create extreme heat adaptation and emergency response plans
- Expand funding for programs that provide cooling assistance to low- and fixed-income households
- Direct the Occupational Safety and Health Administration to set heat-protective standards for outdoor and indoor workers
- Invest in heat-resilient infrastructure (e.g., train tracks that won't buckle; roads that won't melt)
- Create and strengthen policies to reduce transportation emissions
- Invest in renewable energy, energy efficiency, and new low-carbon energy technologies
- Put an economy-wide price on carbon emissions

"WE NEED UCS SCIENT THE

On the organization's 50th anniversary, five UCS experts sit down for a wide-ranging discussion about the work that lies ahead and the importance of seeking just and equitable solutions.

EDITOR'S NOTE: *As part of our series of* Catalyst *features highlighting the Union of Concerned Scientists' 50th anniversary, we convened a group of experts from across the organization to share their thoughts about the future. The panel discussion, held in our Washington, DC, office on June 4, included: Astrid Caldas, senior climate scientist in the UCS Climate and Energy Program; Richard Ezike, who just completed a two-year stint as a UCS Kendall Fellow in the Clean Vehicles Program and is moving to a new position as senior policy associate, Innovation for Inclusion, at the Urban Institute; Gretchen Goldman, research director in the Center for Science and Democracy at UCS; Julie McNamara, senior energy analyst in the UCS Climate and Energy Program; and Ricardo Salvador, director of the UCS Food and Environment Program. Seth Shulman, UCS editorial director, moderated the discussion.*

SETH SHULMAN: To kick things off, let me ask each of you: in the decade ahead, what UCS work do you see as most pressing and essential? Given all that's happening with clean energy, Julie, let's start with you.

JULIE MCNAMARA: On the renewable energy front, we've started to see some impressive progress at the state level and at the city level in some places. But bottom up isn't always enough, so we need to push for more at the federal level. We've started to see coal coming offline in record numbers; that's economics, and that's a start. But the transition away from coal has a very hard, challenging effect on people, on communities,

COURAGE”

ISTS ON NEXT 50 YEARS

"GIVEN THE SCALE AND URGENCY OF THE CLIMATE CRISIS, I THINK THE BIGGEST THING WE NEED TO DO IS SHIFT OUR THINKING FROM INCREMENTAL TO TRANSFORMATIVE."

—JULIE MCNAMARA,
SENIOR ENERGY ANALYST,
UCS CLIMATE AND ENERGY PROGRAM

the loss of the tax base, the loss of good jobs. We certainly don't want to set ourselves up for similar losses with natural gas, so stemming an overreliance on natural gas is the single most important thing for UCS to focus on at this juncture. Longer-term, though, given the scale and urgency of the climate crisis, I think the biggest thing we need to do is shift our thinking from incremental to transformative.

RICARDO SALVADOR: Yes. With regard to food and the environment, we need to do nothing less than change who we are, how we behave, and how we relate to the planet and its resources. We often say we are seeking to reform the system to make it healthy, green, fair, and affordable. For example, if we want a fair food system, we need to recognize the value of labor. Today, we have a US food system that is literally descended from slavery, that is still 95 percent controlled by white people, and that values the rights and the enrichment of large landowners and capital owners but not of labor.

To create a system that treats labor with dignity, we need to address things such as immigration policy. We have an immigration policy right now that essentially says to the labor force for agriculture that we want their labor but we don't want *them*. And that's a xenophobic, racist policy. So that means we need to work to reform that view. I don't think most Americans believe they live in that sort of society, or want to sanction it. Paying people the fair value of their work, according to some estimates, would increase the price of our food by about a dollar a day. If we're not willing to pay that $360 more on an annual basis, then we don't believe in all the things we say that we believe as a country in terms of equal opportunity and the dignity of human lives. So, UCS has a role to play in making these connections visible.

SETH SHULMAN: The Center for Science and Democracy at UCS has catalogued more than 100 abuses of science committed by the Trump administration thus far. Gretchen, let me ask you: what do you see as the top steps UCS needs to take in the years ahead to rebuild scientific integrity in our decisionmaking processes?

GRETCHEN GOLDMAN: The Trump administration's actions have brought to light a lot of vulnerabilities in the system we didn't know existed. We now have an administration that doesn't care about following process or using science, or even making it look like they are using science. We're seeing the places where science isn't protected and the impacts of that on everyday people, from the food we eat to the water we drink and the products we use. But we're also seeing that we cannot protect science unless we have a functioning democracy. In the near term, we need to tackle that by fixing problems in our democracy that have come to light. The US House of Representatives has already passed HR1, a sweeping bill that would address a lot of the corruption and democracy issues that we've seen in the Trump era. So that's a start.

The other big category I'd like UCS to continue to focus on is the fact that we know communities of color and low-income communities bear a higher burden from a lot of this administration's environmental rollbacks. I would like to see UCS address the vast inequities we face in who has access to clean air and clean water and democratic representation. I want to see us show up for racial justice and social justice issues, and to be clear about who's being impacted when science is sidelined and democracy is sidelined. I want to see us using our voice from the position of power and privilege that scientists have in our society. We should be using that to sound the alarm when we see inequities, and working to address them in everything we do.

ASTRID CALDAS: Yes. We have been talking increasingly about that common thread of equity and how differently

Photos: Mike Olliver

people are affected. I've been going to talk to a lot of people in these communities. And they really are facing the direct impacts of climate change right on their doorsteps. If we're really going to address these issues of equity the way UCS tackles other issues, I think the organization needs more social scientists on staff. They can help us measure how some communities are differentially impacted, and I think social scientists have lots of great ideas about what we can do to change the system too. Building this kind of social science work into our efforts at UCS can help us go beyond just talking about these issues and move toward this equity goal in a meaningful way, planning solutions and charting our progress.

SETH SHULMAN: Thanks, Astrid. Before moving on, I want to make sure we hear from Richard about transportation priorities.

RICHARD EZIKE: Well, transportation is now the largest generator of climate emissions, surpassing the power sector a few years ago. So if we're really going to tackle climate change, we need to look at transportation emissions, and that means looking at land use—where people are living, where housing is being built—to ensure we don't exacerbate the issues we're already facing today when it comes to transportation emissions. It's very challenging because where we move, where we go, and where we live—they're all interconnected and a lot of our choices are very ingrained in our way of living.

Today, for example, 85 percent of all US commuters drive by themselves. UCS needs to think about how we change that narrative to understand that, yes, it's convenient, but it's detrimental in so many ways. We're actively involved in electrifying our transportation fleet and fighting for strong fuel economy standards—these are vitally important. But looking ahead, we need to think as broadly as we can about how these issues intersect, including the issue of public transit. Historically, in the United States we have not invested in public transit the way our counterparts in Europe and Asia have. They invest billions of dollars. They have high taxes in order to invest in public transit because they know they just can't clog all these cars on the roads. Shifting that narrative, shifting that investment, and really engaging people to think about our choices for cleaner modes of transit beyond the car will help us grow and prosper.

SETH SHULMAN: I'm struck by the breadth and complexity of these systemic changes many of you are calling for. What does UCS need to accomplish this work?

GRETCHEN GOLDMAN: I'd say we need the courage. We need to be able to be comfortable working on these issues, and thinking bigger than we historically have. It isn't that many of these issues are so far removed from our work. If we look at it, they've been there the whole time in many ways. We just haven't always focused on them. So I feel like there's a lot we can do if we choose to and if we're open to new partnerships and some new priorities. I think we've started to get there in recognizing a lot of these intersectional issues and understanding that UCS has a unique position of leading with the science. I think we can use that for even more good than we have in the past by putting it to work on these bigger issues.

RICARDO SALVADOR: I agree we need to have the courage to ask those sorts of questions. We came up with this system

"WE NEED TO DO NOTHING LESS THAN CHANGE WHO WE ARE, HOW WE BEHAVE, AND HOW WE RELATE TO THE PLANET AND ITS RESOURCES."

—RICARDO SALVADOR,
DIRECTOR,
UCS FOOD AND ENVIRONMENT PROGRAM

of science to try to make sure that claims we make about the physical world are independently verifiable. We've developed it to make sure we don't fool ourselves. But the key thing to understand is that, because it is a human activity, science is susceptible to human bias, especially in the questions we ask.

For example, a lot of agricultural scientists see pesticides as a tremendous advancement because they've spared a lot of drudgery and manual labor in the field. But farm laborers are some of the biggest advocates of organic agriculture because they don't want to be exposed to that stuff. Epidemiologically, they're the most susceptible to cancers that are related to these very potent chemicals we've created to protect crops against pests. Not surprisingly, they tend to see science and scientists as bad actors because they see them serving the interests of Dow and Bayer and all the companies that develop those chemicals. And when they raise objections, they tend to be framed as if they're anti-science or anti-progress, when they're really about safety and well-being for their families. So, to build a more equitable system, we need to think about the damage these chemicals do to people who actually work in those fields.

JULIE MCNAMARA: Related to that idea of seeing the bigger picture, one thought I have is that, while the climate crisis is incredibly trying, it also presents a real opportunity. Within UCS, I see that the issue of climate change is bringing together our different programs. I think I've collaborated with almost all of you at this table on different projects already. And I think it's something that'll continue to happen more and more.

RICHARD EZIKE: Yes. I think the Green New Deal has really put a similar perspective into a lot of people's minds about what's needed to move to a carbon-free economy. And I know we've already started a lot of work on that end.

"WE CANNOT PROTECT SCIENCE UNLESS WE HAVE A FUNCTIONING DEMOCRACY. . . . WE NEED TO TACKLE THAT BY FIXING PROBLEMS IN OUR DEMOCRACY THAT HAVE COME TO LIGHT."

—GRETCHEN GOLDMAN,
RESEARCH DIRECTOR,
CENTER FOR SCIENCE AND DEMOCRACY AT UCS

Maybe working with each other we can look at how we incorporate land use, and think about possibilities like urban farming. That's an example of an issue that comes from this kind of intersection: another way of providing food in an environment where we're constrained by land.

ASTRID CALDAS: I'm excited by these kinds of opportunities but I do want to add one thing. I was on a panel once where one of the panelists, William Brangham from *PBS NewsHour,* was talking about the Montreal Protocol—the effort to protect the ozone layer—and he noted that a major factor in how well it worked was because chemicals existed at the time as a substitute for the bad stuff that was causing the ozone hole. He said his mom used to use hairspray. She didn't want to get rid of her "big hair" hairstyle and yet she could get the same result with something that was not damaging the environment. So I always think about that: what is the alternative we can offer when it comes to low-emissions solutions? We need to think about this because people are more amenable to change if they don't see it as a threat to their lifestyle.

"I'VE BEEN GOING TO TALK TO A LOT OF PEOPLE IN THESE COMMUNITIES. AND THEY REALLY ARE FACING THE DIRECT IMPACTS OF CLIMATE CHANGE RIGHT ON THEIR DOORSTEPS."

—ASTRID CALDAS,
SENIOR CLIMATE SCIENTIST,
UCS CLIMATE AND ENERGY PROGRAM

GRETCHEN GOLDMAN: I think that's right, but the other piece to note is that many of the issues we need to address involve much more than personal action alone. I think UCS has a big role to play in showing who is really responsible for the set of choices we have, and for holding decisionmakers and companies accountable. In other words, it's not just about whether or not I use a plastic straw—it's about "Why did companies create a system of disposable plastic?" We should be holding accountable the people in power that make those kinds of decisions and have the power and capital to change them.

JULIE MCNAMARA: The good news is, I think UCS is well positioned to address so many different aspects of the challenge, how it crosses certainly the power sector, transportation. When you bring multiple sectors together, it helps get you back to the fact that people live in that intersection. When you bring these different perspectives together, you get a much fuller picture. I certainly think that is an opportunity that will make our work better in our efforts to decarbonize the power sector.

ASTRID CALDAS: You know, UCS was really kind of a dream job for me, not just because of the credibility and reputation that UCS has across the board, but because it is a place that has the guts to address these issues. I think we're saying here that it doesn't hurt to have even more guts and I agree that we need to be more on the offensive than we have been in recent times. I mean, there's so much defensive stuff to do that we sometimes forget how important it is for us to help set the agenda.

SETH SHULMAN: That seems like a great note to end on. Thank you all—for your ideas and for all your amazing work.

JULIE MCNAMARA: I feel like there's so much more to say. I could keep talking with you all for hours.

GRETCHEN GOLDMAN: I feel energized. We should have planned to take some kind of action after a discussion like this—maybe joined a march or something? {C}

"IF WE'RE REALLY GOING TO TACKLE CLIMATE CHANGE, WE NEED TO LOOK AT TRANSPORTATION EMISSIONS, AND THAT MEANS LOOKING AT LAND USE."

—RICHARD EZIKE,
FORMER KENDALL FELLOW,
UCS CLEAN VEHICLES PROGRAM

Leading the Way on Renewable Energy

BY ELLIOTT NEGIN

The Union of Concerned Scientists has been in the renewable energy vanguard for decades, championing its benefits and pioneering strategies to steer the country toward a clean energy future.

The organization's entry into the field came in the early 1980s, when we began exploring renewables as an alternative to nuclear power in the wake of the Three Mile Island accident. But our efforts intensified in 1988, then the hottest year on record at the time. A summer heat wave and drought in 40 states were responsible for as many as 10,000 deaths and some $71 billion in agriculture-related losses. In June of that year, with temperatures in Washington, DC, approaching 100°F, NASA scientist James Hansen made headlines when he testified before Congress about the dangers of global warming. The UCS board and staff recognized that climate change presented an existential crisis, and renewables appeared to be a viable solution. "It was a good issue," says then-UCS Research Director Michael Brower, now vice president for renewable energy at UL, formerly known as Underwriters Laboratory. "It was technical," which played to UCS's strengths.

In January 1989, Alden Meyer, former director of the League of Conservation Voters, joined UCS to start a climate change and energy program. "We decided to focus our initial work on renewable energy and clean vehicle technologies," says Meyer, who, 30 years later, is still at UCS as its director of strategy and policy.

Under Meyer's watch, UCS analysts co-produced a report in 1991, *America's Energy Choices*, which debunked the prevailing assumption that renewables could not contribute significantly to the nation's energy mix. Brower and his research team then followed up two years later with the pathbreaking

COAL POWER IN 1998 COMPRISED 52% OF THE US ELECTRICITY MIX; BY 2018, ITS SHARE DROPPED NEARLY IN HALF, TO 27%.

Photo: Karsten Wuerth/Unsplash

report *Powering the Midwest,* which used a geographic modeling system to identify wind power opportunities in 12 states, estimate the costs of connecting wind farms to the transmission grid, and pinpoint counties that could grow a significant amount of fast-growing switchgrass for energy use. At the time, 74 percent of the electricity produced in the region came from burning coal.

While Brower and his coauthors were working on their analysis, UCS field organizers met with state legislators, environmental activists, and farmers across the Midwest to build support for renewable energy. "We were able to show that siting wind turbines on farms would be an economic boost for local economies," says Wenonah Hauter, who oversaw UCS Midwest outreach efforts and is now the executive director of Food and Water Watch. "There was a lot of excitement about moving to renewables."

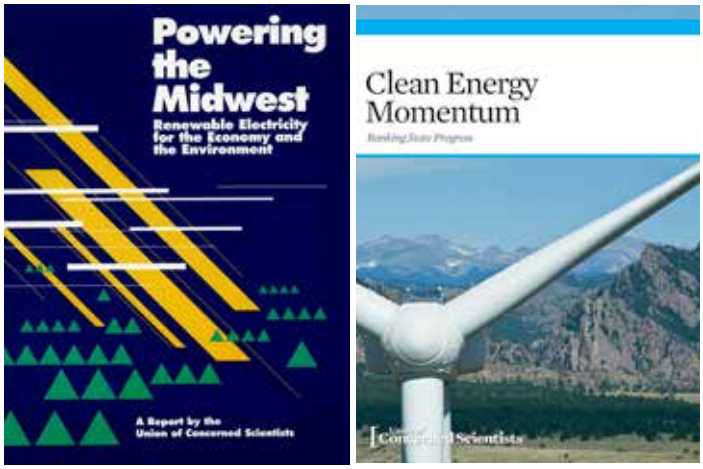
What was missing, however, was a policy mechanism to encourage renewables. By happenstance, Nancy Rader, an energy consultant who later went to work for the American Wind Energy Association, hatched a brilliant idea shortly after the Midwest report came out: require utilities to supply a percentage of their electricity from wind, solar, or other renewable energy resources by a specific year. She called it a renewable portfolio standard (RPS). In subsequent years, UCS also referred to it as a renewable electricity standard (RES).

UCS quickly became the national leader in promoting the concept and persuading states to adopt standards, which collectively has proven to be one of the most effective approaches for curbing global warming emissions.

BUILDING MOMENTUM

Since those earliest reports, UCS has produced dozens of studies demonstrating the benefits of renewables, advocated for renewable standards across the country, and developed regulations to implement them. Today, 29 states and the District of Columbia have an RES. Seven states and Washington, DC, have a requirement of 50 percent or more by 2030, while Washington, DC, is the most aggressive with a 100 percent target by 2032.

The standards have had a major impact. According to a 2016 Department of Energy report, they cut carbon pollution nationally by 59 million metric tons in 2013 alone—akin to closing 15 average-sized coal-fired power plants—and dramatically reduced emissions of sulfur dioxide, nitrogen oxides, and particulate matter, producing health and environmental benefits equivalent to an estimated $5.2 billion. Likewise, the standards have helped drive down the cost of wind and solar by at least 70 percent over the last decade, when US wind capacity increased by nearly 400 percent and solar power boasted an average growth rate of 50 percent.



For more than a quarter-century, UCS has been advocating for, and charting the progress of, clean energy development in states across the country.

Building on the momentum of state standards, UCS continues to lead the way on clean energy, demonstrating how electric grids can accommodate even higher levels of renewables, and emphasizing the importance of energy storage.

US WIND AND SOLAR ELECTRICITY GENERATION INCREASED SIXFOLD BETWEEN 2008 AND 2018, AND NOW ACCOUNTS FOR MORE THAN 8% OF OUR NATION'S POWER SUPPLY.

UCS also has been pushing for a national RES. Currently we are backing the Renewable Electricity Standard Act of 2019, recently introduced by New Mexico Senator Tom Udall, requiring utilities in every state to increase their use of renewables to supply at least 50 percent of the nation's energy by 2035. The legislation would put the United States on a path toward decarbonizing its power sector by 2050, in line with emissions reductions recommended in the latest UN Intergovernmental Panel on Climate Change report. {C}

Preserving the Science in Our Dietary Guidelines

By Sarah Reinhardt

Nearly 60 percent of all adults in the United States suffer from one or more chronic diseases, including cancer, cardiovascular disease, and type 2 diabetes, the leading causes of death and disability nationwide. These diseases not only shorten lives, but also are extremely expensive to treat. Along with mental health conditions, they account for 90 percent of the nation's $3.5 trillion in annual health care expenditures.

Research shows that many of these diseases are caused at least in part by poor diet. Most people fall far short of consuming the daily recommended amounts of fruits, vegetables, and whole grains. They also eat too much sugar, refined grains, sodium, and processed meats.

Fortunately, we have proven, effective tools to help combat diet-related disease. Chief among these is the *Dietary Guidelines for Americans,* a comprehensive set of federal nutrition recommendations developed every five years by a panel of scientific experts. The guidelines are intended to inform federal programs that serve millions of children, parents, seniors, veterans, and other members of the general public each day. However, the United States has not done enough to implement the guidelines, so they do not have the impact they should on people's diets.

The new Union of Concerned Scientists report *Delivering on the Dietary Guidelines* shows that if the US government had supported actionable, science-based guidelines that called for limiting consumption of processed meats and added sugar—and if Americans were able to follow them—we could have saved nearly 23,000 lives and reduced medical costs by $18 billion in 2018 alone. Furthermore, if Americans had followed the guidelines' fruit and vegetable recommendations, an additional 110,000 lives and $32 billion could have been saved.

Members of the military are just some of the millions of people nationwide who benefit from the science-based recommendations in the Dietary Guidelines for Americans.

With the process to develop the *2020–2025 Dietary Guidelines* now under way, the Trump administration's industry-friendly bias and anti-science agenda threatens to make it even more difficult to realize the guidelines' potential. The final guidelines are expected to be released by the end of 2020, and UCS is working to ensure that science remains at the center of the process.

We're calling on the administration to resist food industry pressure and publish guidelines that prioritize public health, and to address systemic barriers to healthier diets. Among other things, this can be done by maintaining school nutrition standards that reflect the guidelines' recommendations, supporting programs that provide incentives for low-income shoppers to purchase local fruits and vegetables, and promoting policies that help make the healthy choice the easy choice. {C}

Sarah Reinhardt *is the lead analyst for food systems and health in the UCS Food and Environment Program. Read more from Sarah on our blog,* The Equation, *at* http://blog.ucsusa.org.

Photos: Sammi Gaines/UCS (Sarah Reinhardt); Department of Defense (cafeteria); Twinpix/Getty Images (ad)

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CONTACT US

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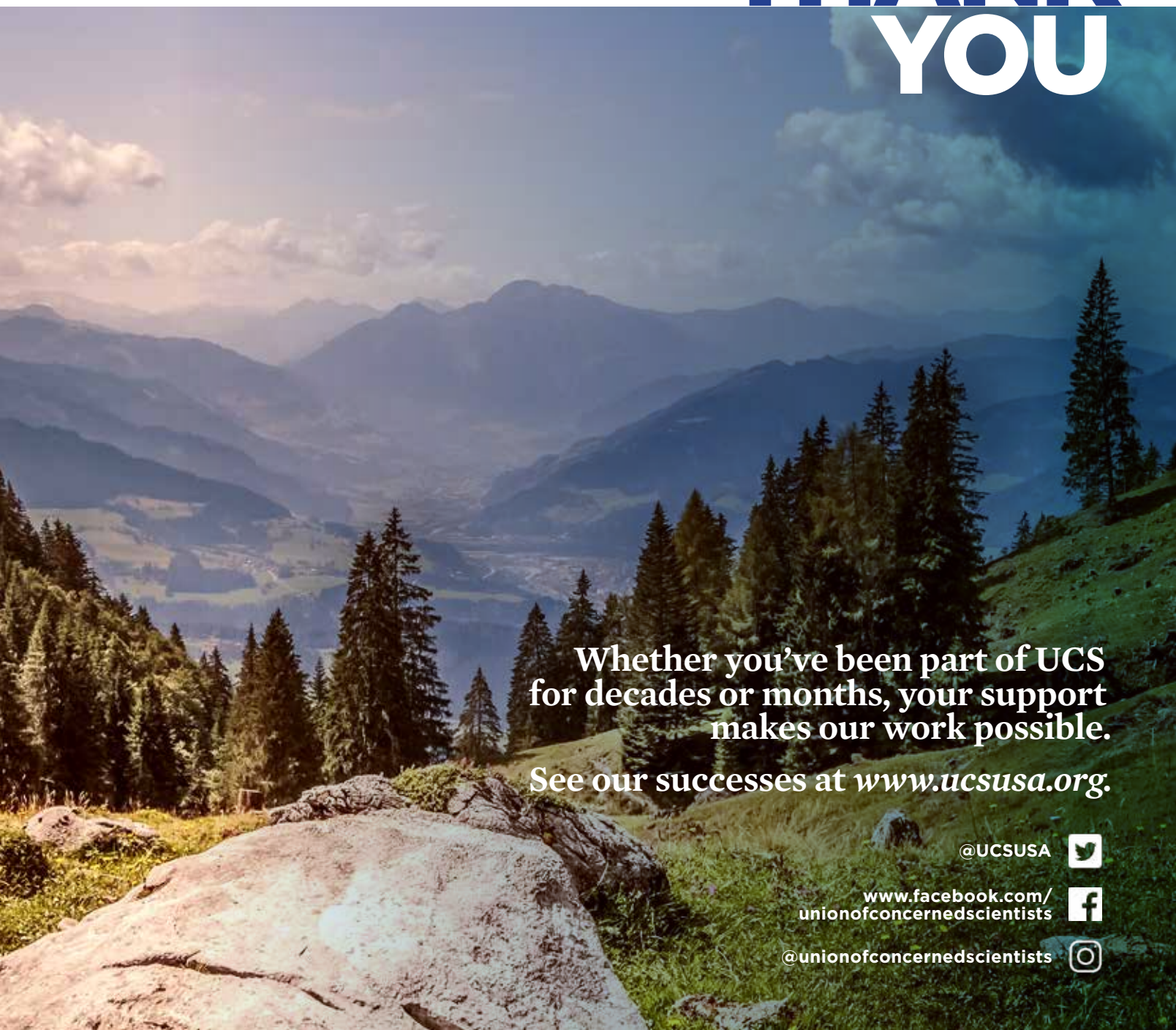

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