Union of Concerned Scientists

Catalyst

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100 Percent Renewable Electricity?

It's Possible

Electric Cars Charge Ahead

Ukraine Invasion Puts Nuclear War in the Spotlight

[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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Crises Are Everywhere—So Is UCS

The past few months have been unsettling for many of us. An unjustified war of aggression is wreaking devastation on the people of Ukraine and holding the world hostage to nuclear threat. We're on the cusp of drought and wildfire season in the western United States, which endangers thousands of lives, homes, and communities. The latest UN climate report warned that the window for protecting a "livable future for all" is closing fast (see p. 5). It's enough to be overwhelming—even before factoring in the third year of the COVID-19 pandemic.

Do you have days when you wonder what kind of actions could possibly make a difference in these complicated times? I think many of us at the Union of Concerned Scientists ask ourselves the same question. Here's what I've landed on:

Our work and mission are as vital and important as ever. The war in Ukraine has opened the world's eyes to the interconnected threats of nuclear security, authoritarianism, and climate change. These issues are central to the UCS mission.

United, we win. As individuals and as an organization, we know we will not be able to generate the systems-level changes needed to avoid climate catastrophe, or minimize nuclear threats, on our own. We're building partnerships to put science at the center of collective action and advocacy.

Agility is the new normal. We're applying lessons learned after the 2016 election to today's volatile political landscape, working with decisionmakers in the administration and Congress on federal climate action while seeking greater traction in states and localities with climate-friendly governors, mayors, and others.

Our integrity is priceless. We will navigate the world of power and politics while remaining a trusted and nonpartisan source of truth.

I'm grateful to be at the helm of the leading independent, science-centered advocacy group working to minimize these grave threats. Whether it's energy expert Paula García and her team helping states realize their commitments to 100 percent renewable energy (p. 8), climate scientist Pablo Ortiz raising awareness of the challenges facing California's Central Valley (p. 18), or nuclear reactor and fuels expert Ed Lyman providing the international media an independent perspective on Ukraine (p. 7), each of my UCS colleagues is fighting for the better world we know is possible.

As always, thank you for joining with us and helping us continue this crucial work. {C}

***Johanna Chao Kreilick** is the president of UCS.*

Photos: Samel Jerónimo/Unsplash (Ukraine); Tara Rice (Johanna Chao Kreilick)

WHAT OUR SUPPORTERS ARE SAYING

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

ON BIG OIL USING THE WAR IN UKRAINE TO CALL FOR GASOLINE SUBSIDIES:

Susanne Holland:
The recent conversation about reducing taxes on petroleum products to ease the impact of high prices for gasoline is absurd. Oil companies are raking in profits. That's called war profiteering, and we must not subsidize it.

@ittyruffle:
Haven't they made enough money? Maybe at some point their returns can mirror actual investment portfolios with profits fluctuating instead of just climbing up constantly?

Zenovia Katch:
Fossil fuel oligarchs are the same everywhere.

ON THE RAPID GROWTH IN ELECTRIFICATION OF LARGE TRUCKS AND BUSES:

Tim MacDonald:
[Sam Wilson's March 21 blog post "We Can Electrify One in Three Heavy Duty Trucks by 2030: Here's How"] is an excellent example of how science can help create an inspiring [narrative] for climate action that can attract broad-based popular support. Keep up the good work!

Peter Laws:
The US [Postal Service] should be REQUIRED to use electric vehicles for any service/route/whatever that covers less than 100 miles/day . . . which I expect is almost all of them.

ON ILLINOIS IMPLEMENTING ITS CLIMATE AND EQUITABLE JOBS ACT:

Dan Collins:
We are on the cusp of homes with their own solar power systems and cars that charge by sitting in the sun all day. Exciting times.

Vicki Triplett:
I am glad there is a strong focus on restructuring the [electricity] grid. That is probably the biggest behind-the-scenes change that needs to come about in order for renewable energy to also be effective. Kudos!

ON THE RELEASE OF THE LATEST UN CLIMATE REPORT (SEE P. 5):

Brad Roth:
The evidence underlying climate change is overwhelming. Why don't people believe the science?

John Doucette:
Floods in Germany. Wildfires in the eastern Mediterranean. Wildfires in Siberia . . . Droughts apparently everywhere. Brazil wants to burn down the Amazon. There's a risk of ocean currents collapsing. Nor is it just about us humans. We are making the world unlivable for thousands of species of animals. We don't have time to dither and play political games.

tromatojuice:
Unfortunately, our leaders right now seem to be like that bully kid on the school court, the one who gets the ball and then plays the rest of the game solo.

[IN THIS ISSUE]

Hawai'i Case against Fossil Fuel Companies Moves Forward

In a major milestone, a judge in Hawai'i recently ruled that a lawsuit seeking damages from major oil and gas companies for their climate disinformation campaigns can move forward in state court. The ruling sets an important precedent that the fossil fuel industry has been fighting to prevent in similar cases across the country.

In the lawsuit, the city and county of Honolulu charge that Chevron, ExxonMobil, Shell, Sunoco, and other major oil and gas producers have worked for decades to deceive the public and policymakers about the devastating impacts of climate change. As a result, it claims, communities in Hawai'i now face increased flooding, more extreme weather events, and rising seas. Under the current emissions trajectory, the state faces more than three feet of sea level rise within the century, putting more than $19.6 billion of land and infrastructure at risk. The lawsuit charges these impacts were exacerbated by the companies' deliberate decisions to hide findings and sow public mistrust in climate science.

SKELETONS IN THE CLOSET?

The Hawai'i ruling is particularly notable because it marks the first time a climate disinformation case has moved to the legal "discovery" phase, in which the companies charged can be forced to disclose internal company documents and correspondence. Its findings could have a bearing on dozens of similar lawsuits now pending in the United States, including cases brought by the attorneys general of Connecticut, Delaware, Massachusetts, Minnesota, Rhode Island, Vermont, and the District of Columbia.

Notably, during efforts to hold US tobacco companies liable for the damages caused by their products, scores of cases were defeated and dismissed before one brought by the state of Minnesota advanced to the legal discovery phase and subsequently to trial. The documents that came to light, combined with grassroots campaigning, played a major role in eventually forcing tobacco companies to shut down their lobbying efforts, cease certain marketing tactics, and pay out billions of dollars in damages and penalties.

Research from the Union of Concerned Scientists is cited prominently in many of the lawsuits seeking to hold fossil fuel companies accountable for climate damages and fraud, and the UCS Science Hub for Climate Litigation (online at http://act.ucsusa.org/science-hub) supports this work by connecting scientific experts with legal scholars and practitioners in this field. Back in 2019, we co-sponsored a public forum on the climate liability of fossil fuel companies with the University of Hawai'i School of Law and the Center for Climate Integrity, accompanied by briefings with local officials. Honolulu city and county filed its lawsuit 10 months later, and Maui County followed by the end of 2020.

Photo: Werbeagentur ComMotion/Pixabay

Public Health Experts: Your Voice Is Needed on Chemical Safety

Facilities that produce and contain dangerous chemicals are subject to an Environmental Protection Agency (EPA) rule called the Risk Management Plan (RMP), which requires a written set of procedures for handling accidental chemical spills or releases. This may seem like common sense, but without rules in place, many companies don't bother to map out their worst-case scenarios—which puts the communities they're located in at risk from health hazards related to water, air, or soil contamination.

There are more than 12,000 "RMP facilities," as these sites are known, throughout the United States. Exposure to the chemicals they produce can be dangerous and even deadly. And according to the Government Accountability Office, a nonpartisan congressional watchdog agency, one-third of RMP facilities are at risk of future disasters due to climate change. These findings mirrored a 2021 joint analysis by UCS, Earthjustice, and the Center for Progressive Reform that called for the federal government to address "double disasters"—hazardous chemical releases worsened by inadequate action to prepare for climate change and natural disasters.

The current rule does not mandate that chemical facilities consider the impending effects of climate change such as sea level rise—creating disproportionate risk for people of color and people with lower incomes, who are more likely to live near such facilities. The EPA is currently working on a new rule, slated to be open for public comment by September 2022, with a final rule to be issued by August 2023. If you are a public health expert or a member of a community affected by a chemical facility, you can use your voice now to help strengthen the RMP. Visit http://act.ucsusa.org/protect-rmp to track this issue while UCS pushes for federal safeguards that will save lives during future chemical disasters.

Photo: Troy Squillaci/Pexels

UCS Helps Communicate UN Climate Report Findings

Reports from the United Nations' Intergovernmental Panel on Climate Change (IPCC) represent the gold standard of current climate science, drawing upon peer-reviewed literature and several years of hard work by scientists around the world. In February, after the IPCC released the second part of its latest report, focusing on climate change impacts, adaptation, and vulnerability, the UCS climate team went into overdrive to explain and amplify its findings to the public. Our team explained that this report is the IPCC's most dire assessment yet, making it clear that the climate crisis is already upon us and that current efforts to slash global warming emissions continue to fall far short of what's needed.

All told, UCS staff contributed to about 700 media stories about the report. As Rachel Cleetus, acting deputy director of the UCS Climate and Energy Program, sums it up: "The world's scientists are saying that the time for incrementalism is over. Now is the time for transformative actions to help secure a safer, more just, and sustainable future for all."

Clean Trucks Drive Change across the Country

Trucks and buses remain a major source of both climate pollution and localized air pollution that takes the form of smog and fine particulate matter, which irritate and inflame the lungs, worsen asthma, and cause tens of thousands of premature deaths nationwide each year. The impact on public health is especially pronounced in Black and Brown communities adjacent to ports, rail hubs, and freight corridors.

Using electric trucks and buses for shipping and transportation is one promising solution toward addressing this toxic pollution, and many are readily available for deployment. Transitioning to electric trucks and buses would also cut down on climate pollution, save money for fleet operators, lower electricity bills, and allow communities to breathe more easily.

In recent years, California has taken the lead in passing innovative clean truck policies, and the rest of the country is only just catching up. In the summer of 2020, 15 of the state's jurisdictions signed a nonbinding memorandum of understanding that lays out truck electrification goals. And over the past year, five states—Massachusetts, New Jersey, New York, Oregon, and Washington—have followed California's lead by adopting the Advanced Clean Trucks rule, which is a first-of-its-kind regulation that guarantees an increasing number of electric trucks sold in these states.

As an allied member of the Moving Forward Network (MFN), a national grassroots-led coalition that focuses on zero-emissions trucks, UCS continues to advance clean truck and bus policies in California, other states, and at the federal level. We've created fact sheets that outline the health care costs and human toll from dirty trucks and promoted the results to policymakers in each of the states that have adopted the Advanced Clean Trucks rule, and others that are likely candidates to do so, including Connecticut and Maryland. Through this relevant and timely analysis, advocacy, mobilizing our Science Network, close collaboration with MFN partners, and connecting experts with community groups fighting pollution through our Science and Community Action Network (SciCAN), we are helping reduce vehicle pollution nationwide. Learn more about our efforts to clean up truck pollution at www.ucsusa.org/resources/truck-pollution-united-states.

ELECTRIC TRUCKS AND BUSES **CUT DOWN** ON GLOBAL WARMING **EMISSIONS**, **SAVE MONEY** FOR FLEET OPERATORS, AND **REDUCE AIR POLLUTION** IN NEARBY COMMUNITIES.

Photo: Daimler Truck North America

Defending Our Democracy

Gerrymandering, disinformation, and restrictive voting policies have put the US electoral system in a precarious position. On March 30, UCS experts led an online discussion, sponsored by our Kurt Gottfried Society, on how to overcome these challenges and build a fair and resilient democracy. Our speakers from the Center for Science and Democracy at UCS—Campaign Director Danielle Fox, Senior Fellow Michael Latner, and then-Center Director Andrew Rosenberg—explored policies that could ensure an equitable voting system, the role of science and scientists in democracy-building efforts, and how individuals can help protect our nation's voting rights heading into the midterm elections—and beyond.

If you missed the conversation, visit https://youtu.be/dKwdluchOlk to watch the event and learn how you can get involved. Let's make sure our voices are heard!

UCS Experts Respond to Ukraine Invasion

Russia invaded Ukraine just two days after Tara Drozdenko began work as the new director of the UCS Global Security Program (see her interview on p. 12). Despite that timing, she and other UCS experts mounted a swift response, immediately issuing press statements about the risks of a war involving nuclear-armed states.

The war touches many aspects of our work: UCS data on nuclear-armed nations have been frequently cited in the press, and Drozdenko was widely quoted about radioactive fallout in the event of a nuclear attack. On the UCS blog, UCS Food and Environment Program Director Ricardo Salvador assessed the prospect of the war triggering worldwide food shortages, while Senior Energy Analyst Julie McNamara dissected spiking gas prices and the urgent need for nations to wean themselves off fossil fuels. As the Russian military seized the Chernobyl and Zaporizhzhia nuclear power plants, UCS Nuclear Safety Project Director Ed Lyman fielded especially heavy demand from the media for his expertise: as *Catalyst* went to press he has appeared or been quoted in an astounding 2,200 stories.

Parts of the Zaporizhzhia nuclear power plant in Ukraine caught fire after shelling by Russian forces in early March, raising global alarm about a potential meltdown.

UCS Launches a "School" to Train Science Advocates

Although many scientists care deeply about using their expertise to make a difference in the world, very few receive formal training on how to do so. That's why UCS is launching a Science Advocacy Movement Building School—to help professionals working or volunteering for science organizations apply the principles of organizing and power-building.

This free, six-month program is an initiative of the UCS Science Network, whose staff will facilitate alongside social movement scholars and professional coaches and trainers. Program participants, many of whom work for UCS partner organizations, will learn how to amplify their individual and collective impact, and ultimately build a stronger, more inclusive science advocacy movement. The first class is expected to graduate this fall. To learn more about the opportunities for education and activism provided by the Science Network, visit www.ucsusa.org/science-network/science-network-partnerships.

Additional "Advances" Contributor:
Claudia Ward-de León

Photos: Slowking4/Creative Commons (Flickr CC BY-ND 2.0) (protest); Future Publishing/Getty Images (Zaporizhzhia)

ON THE ROAD TO 100 PERCENT RENEWABLES

A new UCS analysis shows that many US states already leading in clean energy can meet 100 percent of their electricity needs with renewable sources—by as soon as 2035.

BY MICHELLE RAMA-POCCIA

It's 6:30 a.m. on a Wednesday morning and the neighborhood group chat is abuzz.

"Did anyone just hear a big boom and now power is out?"

"I heard the boom. We have power though."

"We have no power. It went out with the boom . . . do I call the police or fire station about it?"

It's a scenario that plays out at least once a month with my coastal Massachusetts town's largely decrepit and outdated electricity grid, and not just when the increasingly frequent nor'easters tear out trees from their roots and knock out power for days or even weeks. It's our new normal.

However, as I squint at those texts in the wee hours, I rarely know whether my neighborhood has lost power. That's because, in my home, our power stays on as long as there is energy stored in our two batteries from the previous day's sunlight.

Our family is lucky to have been able to take advantage of state incentives and rebates for homeowners to install solar panels and storage batteries with no money down—and we can even sell the excess electricity we generate back to the grid. As a result, during many days of the year when our neighborhood loses power, we are energy independent. And many days of the year, usually between March and November, we are able to fully power our home with solar energy.

How can more people and communities access renewable energy—including energy options that are climate-resilient—like my family has? According to the recent analysis *On the Road to 100 Percent Renewables*, a lot more people could have this access—and a number of US states stand a good chance of meeting 100 percent of their electricity needs with renewable energy by 2035.

"We ran the numbers and found that even as demand grows, in just over a decade, 100 percent of the electricity these states consume can be renewable," says the report's lead author, UCS Senior Bilingual Energy Analyst Paula García.

Illustration: Anthony Eyring/UCS; Photos: Daniele nabissi/Unsplash (road); Greens MPs/Creative Commons (Flickr CC BY-NC-ND 2.0) (solar installer); Myenergi/Unsplash (electric vehicle); Wang An Qi/AdobeStock (roadside solar); Omari Spears/UCS (wind turbine)

States leading the clean energy transition can both meet electricity demands *and* lower average energy costs, using renewable energy to meet their requirements for 100 percent clean energy, the analysis shows.

A collaboration between UCS and environmental justice groups COPAL of Minnesota, GreenRoots of Massachusetts, and the Michigan Environmental Justice Coalition, with contributions from the Initiative for Energy Justice, the analysis assessed the potential to accelerate the use of renewable energy dramatically through state-level renewable electricity standards.

The partners worked with Greenlink Analytics, an energy research organization, to assess how these standards—which have been major drivers of clean energy in recent decades—affect people's lives, such as by improving public health, jobs, and the cost of residential energy.

On the Road to 100 Percent Renewables (available in English and Spanish at www.ucsusa.org/road-100-percent-renewables) looks particularly at how so-called US Climate Alliance (USCA) states might best address climate change by reducing heat-trapping emissions in key sectors. The USCA is a coalition of 25 governors who committed their states to achieving the goals of the Paris Agreement, which aims to keep global temperatures from rising more than 1.5°C.

Formed in 2017 to fill the void left by the Trump administration's decision to withdraw the United States from the Paris Agreement, the USCA pledges to reduce its collective global warming emissions some 26 to 28 percent below 2005 levels by 2025 and 50 to 52 percent below those levels by 2030, achieving overall net-zero emissions no later than 2050.

The new analysis finds that the USCA states in the contiguous United States can meet 100 percent of their electricity needs with renewables by 2035. What's more, they can do so even with strong increases in demand resulting from efforts to electrify transportation and heating. Even more promising, the process could create hundreds of thousands of good-paying jobs, lower energy costs, and reduce the number of premature deaths and illnesses from pollution.

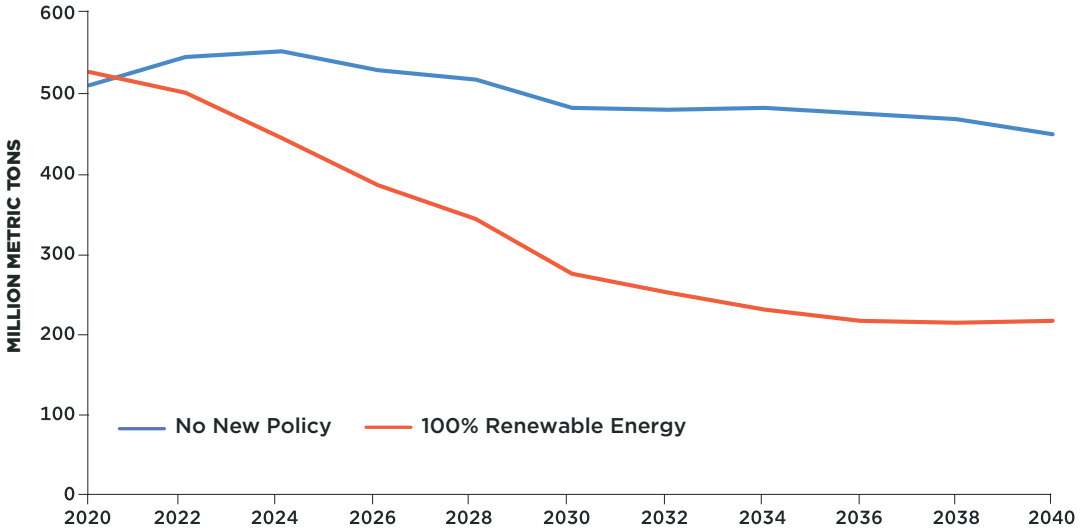
To achieve all of this with the maximum benefits for the greatest number of people, however, renewable electricity standards must be paired with policies that ensure an equitable transition in which all communities share the benefits of a clean energy economy.

SAVING LIVES AND THE PLANET

Perhaps the most eye-opening benefits of a rapid transition to renewables are the vast improvements to people's health and economies.

Photo: Dennis Schroeder/NREL

THE CLIMATE BENEFITS OF A 100% CLEAN ENERGY FUTURE



Reduced use of coal and gas leads to an almost 60 percent drop in power plant CO_2 emissions in the 100% renewable electricity scenario. Electrifying transportation and heating can reduce these emissions even further.

> ***States can meet 100 percent of their electricity needs with renewables by 2035, while creating jobs, lowering energy costs, and reducing pollution-related illnesses.***

Across all the USCA states, the move to 100 percent renewable energy would result in approximately 6,000 to 13,000 fewer premature deaths due to pollution, 140,000 fewer cases of asthma, and 700,000 fewer lost workdays over the next two decades—adding up to almost $280 billion in health benefits from 2022 to 2040. For example, my state of Massachusetts would see a health savings of $6.8 billion in this time period, and Michigan would save $14.9 billion.

The switch to renewable energy can actually *lower* the portion of typical household income spent on electricity and gas—known as the energy burden. With a swift transition to 100 percent renewables, the average energy burden across USCA states is predicted to decline to 3 percent in 2040, from 3.7 percent in 2020. The average-income family in these states would save $150 on energy costs annually with a switch to 100 percent renewables, over the current policies they have in place now. Not included in those calculations are additional savings from electrification, such as avoided gasoline expenses for households adopting electric cars, and avoided heating oil or propane costs for households switching to electric heat pumps.

Of course, a swift transition to 100 percent renewables also has tremendous benefits in combating climate change. In the USCA states, carbon emissions from the power sector would drop 58 percent below 2020 levels by 2040. By contrast, a business-as-usual approach would reduce those emissions only 12 percent; the extra emissions in 2040 alone would be equivalent to the emissions from 100 million typical cars driving across the country and back.

EQUITABLE JOB GROWTH

Accelerating the deployment of renewable energy creates new opportunities in solar array and wind facility installation, increasing demand for electricians, pipefitters, and welders. It also creates opportunities in component manufacturing, sales, financing, and maintenance for those and other renewable energy technologies.

With a swift transition to clean energy, Minnesota alone would gain more than 40,000 jobs by 2040, producing some $4.9 billion in additional labor income. In the states we examined, the expected job growth far exceeds today's total employment in coal-, gas-, and oil-fueled power plants. (Of course, fossil fuel industry workers will need support during the clean energy transition; for more on this, see our 2021 report *Supporting the Nation's Coal Workers and Communities in a Changing Energy Landscape*.)

Importantly, states must pay particular attention to those communities that have been historically—and still are—the most affected by environmental racism and pollution. States should ensure equitable access to job training and entrepreneurship, and pass on the savings from clean energy to those who struggle to pay their energy bills.

"Power plants have been sited in or near marginalized communities for decades, without their consent or participation," says Leslee Gutiérrez, environmental justice lead organizer at COPAL. "We can't perpetuate the same patterns as we advance a clean energy transition." *(continued on p. 21)*

Russia's Invasion of Ukraine Spotlights the All-Too-Real Threat of Nuclear War

INTERVIEW WITH TARA DROZDENKO

Russia invaded Ukraine the same week you started as the new director of the UCS Global Security Program. What was that like?

TARA DROZDENKO: Well, it has certainly been a very busy start as issues of global security and nuclear risks have been thrust into the spotlight in such a horrible way. But it also showed me right away what an amazing and experienced staff we have. I'm very glad to be part of an organization that has so many people with the expertise and know-how to respond to something like this and help people better understand some of the complex threats the war poses—especially the nuclear risks.

What are some of the key points you are making about the nuclear risks in particular?

TARA DROZDENKO: For one thing, when Vladimir Putin announced in late February that Russia would place its nuclear forces on high alert, it rightly raised concerns and worries for people because the nuclear weapons risks are very real and very scary.

I believe this war in Ukraine is one of the two most consequential events in my lifetime having to do with nuclear weapons; the other—a much more hopeful one—being the dissolution of the Soviet Union in 1991. I vividly remember when the Berlin Wall fell and the Soviet Union collapsed. I was a freshman in college and I still remember my surprise and sense of relief when it happened, as though a weight had been lifted. I recognized then all the anxiety I had been carrying my whole life about nuclear weapons, having been born in the 1970s and growing up in the 1980s at the height of the Cold War. The existential threat posed by nuclear weapons was an ever-present reality—a way of life.

Unfortunately, I believe we squandered many of the opportunities that came with that transition from the Soviet Union to Russia. And here we are, almost full circle, with nuclear weapons in the news once again in a very frightening way. Of course, it is important to note that we've continued to live with—and largely ignore—an unacceptable amount of risk from nuclear weapons all this time.

You have a background in plasma physics. How did that lead to work in the security field?

TARA DROZDENKO: Very early on in my career I realized that I wanted to work on problems and issues that I'd now call more "intersectional"—even though I don't think I knew that word at the time.

So, even since my days in graduate school, I realized I wanted to try to have a career that spanned public policy and science and international affairs. I have been aware of UCS advocacy work on missile defense and space policy and nuclear weapons for many years since my arms control work at the US State Department. But, in my most recent previous job as the acting executive director of the Outrider Foundation, I had the opportunity to work in coalition with a number of UCS staff members. That experience made me even more impressed with the organization and excited to join the Global Security Program.

I'm just thrilled to be here because I believe UCS's blend of expertise and advocacy allows the organization to play a unique role in US policymaking. We don't just advocate for certain policies; we gather and share the data to back it up.

TARA DROZDENKO is the director of the UCS Global Security Program. She has nearly two decades of experience in the national security field, working on issues related to weapons of mass destruction for both the US Navy and US State Department. Drozdenko also co-founded Highly NRiched, an open-access platform for educators to incorporate lessons about nuclear weapons into the classroom. Most recently, she served as acting executive director of the Outrider Foundation, a nonprofit focused on ending the threat of nuclear war and reversing the course of global climate change. She has a BS and a PhD in plasma physics from UCLA.

Photos: Jason Mack (Tara Drozdenko); Gary Peeples/USFWS (ad)

> ***By speaking out and letting your elected officials know what you think, you can disabuse them of that mistaken notion that the general public does not care all that much about nuclear weapons.***

I know you're just starting in this position, but are there thoughts you can share about your hopes or plans for how UCS approaches security issues?

TARA DROZDENKO: Well, I am very happy to report that we have the opportunity to add scientific capacity to our ranks, including a new nuclear weapons specialist. We're also planning to bring on a scientist through our Kendall Fellow Program for a two-year project focusing on contamination and harms caused by the nuclear weapons complex—an important line of pursuit for the program.

I'm also looking forward to exploring more collaboration with the UCS climate and energy teams. For instance, China is an increasingly important player in terms of both nuclear weapons and climate change. My hope is that we can find some cross-programmatic ways to address some of the issues related to that. There are also many emerging security issues such as cyberattacks that are playing an increasing role in geopolitics, so that is something else I'm hoping we will address.

A lot of people feel powerless to change US nuclear weapons policies or lessen the threats nuclear arsenals pose worldwide. What do you say to them?

TARA DROZDENKO: Well, there's no question that issues of nuclear weapons and military security have been addressed by a very small and insular group for a long time. And I think this notion of nuclear weapons as the ultimate guarantors of our security is actually an artifact of our dominant culture that we need to change.

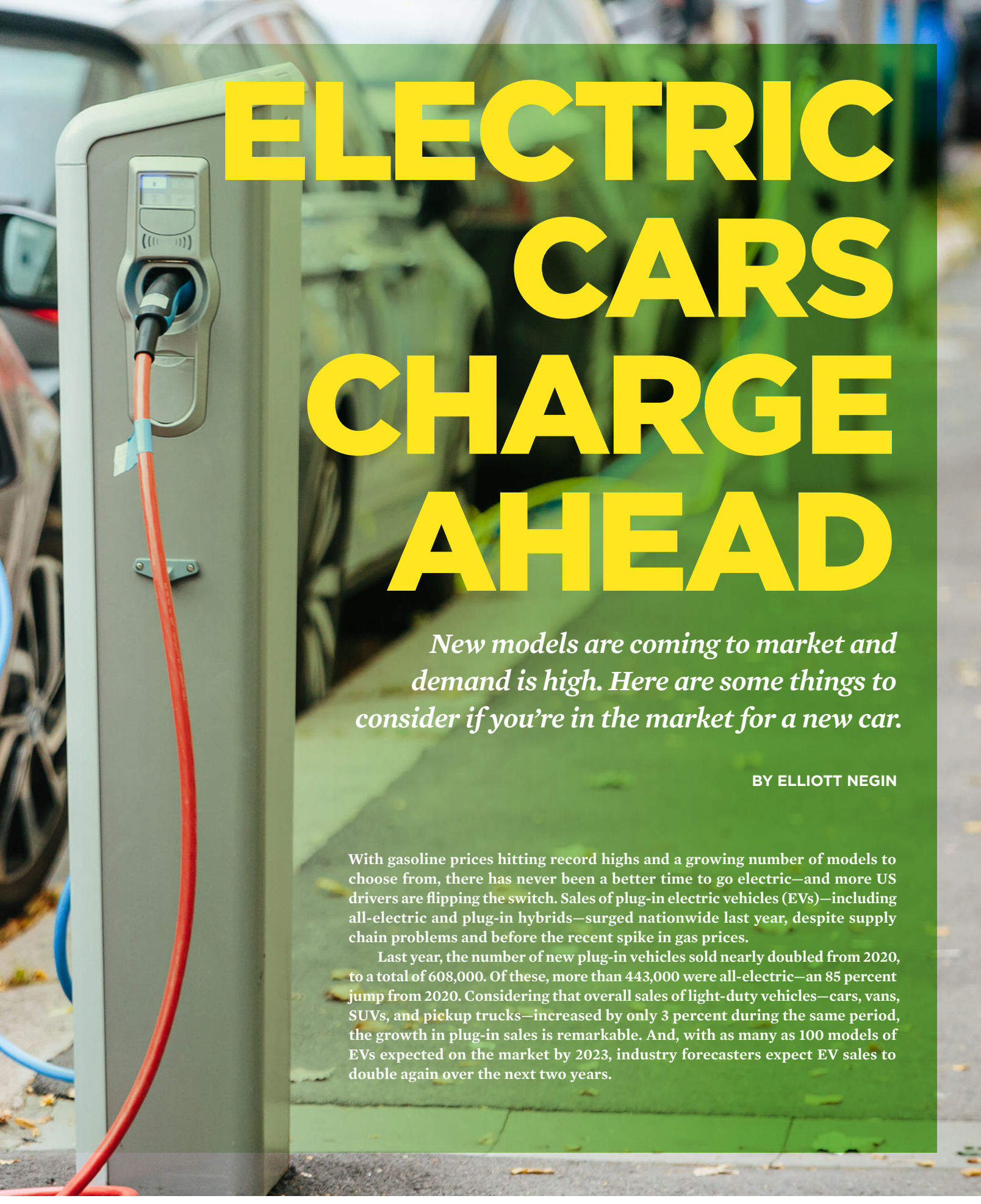
One thing the pandemic has shown us over the last few years is that there are a lot of ways to be insecure. It has really brought to light disparities in our society between people who were able to work from home and didn't lose their jobs and other people who couldn't work from home and did lose their jobs, or had to keep going in low-paying jobs where they were putting themselves at risk of catching a potentially deadly disease. We've also been increasingly aware of climate and environmental impacts (including those from nuclear weapons policies) that put an undue burden on Black and Brown communities that are hit harder and face worse health impacts.

So, I think we need—and are moving to—a more holistic view of security. And, in that way, everything we do to reduce and eliminate nuclear weapons can also be seen as a move toward greater equity in our society.

For folks who want to get engaged with the issue, I would encourage them to express their opinions about nuclear weapons to their elected officials. Let them know how you feel about nuclear weapons spending, or about some of the policies UCS has proposed, such as adopting a "no first use" nuclear policy and ending the US president's sole authority to launch nuclear weapons.

I think, for the most part, lawmakers feel that their constituents don't really care too much about these issues, so they can maintain the status quo without much consequence. By speaking out and letting your elected officials know what you think, you can disabuse them of that mistaken notion that the general public does not care all that much about nuclear weapons. {C}

Photo: scharfsinn86/Adobe Stock



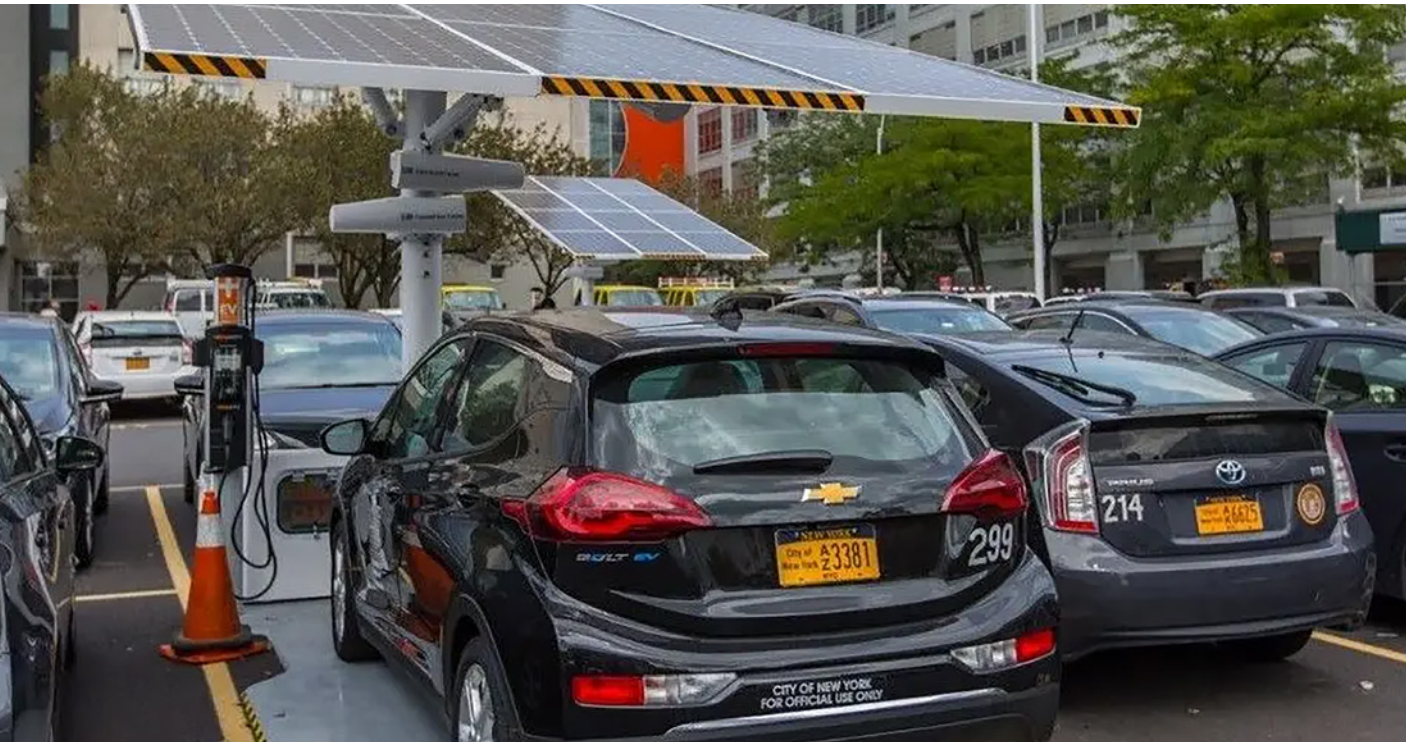
ELECTRIC CARS CHARGE AHEAD

New models are coming to market and demand is high. Here are some things to consider if you're in the market for a new car.

BY ELLIOTT NEGIN

With gasoline prices hitting record highs and a growing number of models to choose from, there has never been a better time to go electric—and more US drivers are flipping the switch. Sales of plug-in electric vehicles (EVs)—including all-electric and plug-in hybrids—surged nationwide last year, despite supply chain problems and before the recent spike in gas prices.

Last year, the number of new plug-in vehicles sold nearly doubled from 2020, to a total of 608,000. Of these, more than 443,000 were all-electric—an 85 percent jump from 2020. Considering that overall sales of light-duty vehicles—cars, vans, SUVs, and pickup trucks—increased by only 3 percent during the same period, the growth in plug-in sales is remarkable. And, with as many as 100 models of EVs expected on the market by 2023, industry forecasters expect EV sales to double again over the next two years.



FINDING THE RIGHT FIT

If you're thinking about purchasing a new car, the first step according to David Reichmuth, senior engineer at the Union of Concerned Scientists, is to carefully assess your needs. You might save the most money—and do the most for the planet—he says, "by taking public transit, joining a car-sharing service, carpooling, riding a bike, or by good old-fashioned walking. Or some mix of all of them."

After all, cars are the largest source of carbon emissions for most people in this country, so going carless can dramatically shrink your carbon footprint. Each typical gasoline-powered passenger vehicle emits about 4.6 metric tons of carbon dioxide per year from tailpipe emissions alone, according to the Environmental Protection Agency, assuming it gets about 22 miles per gallon and travels around 11,500 miles annually. Many city dwellers with decent public transportation options report they have had little trouble hanging up the keys.

But for many people who live outside city centers, having a car is a necessity. So the next obvious question, says Reichmuth, is: "How much car do you really need? Do you need a huge SUV, or just a small car to commute to work?" An EV that meets your needs could substantially shrink your carbon emissions, even if your electricity source isn't very clean. According to Reichmuth's calculations, charging the average EV in this country for driving now produces global warming pollution equivalent to a gas-powered vehicle getting about 93 miles per gallon—roughly half the emissions of today's most efficient gasoline-only models.

FOOTING THE BILL

Though EV sticker prices will fall as batteries improve and more models come onto the market, affordability remains a huge stumbling block for widespread adoption. A 2017 report found that median-income households in all but one of the 25 largest US metropolitan areas could not afford an average-priced new car—electric *or* gas-powered. As a result, used-car purchases outnumber new car purchases by more than two to one, and the gap is even more pronounced for people of color and low-income families.

Unfortunately, there are precious few used EVs on the market today, and relatively few state and tax rebates to help defray the cost of one. Considering that the US transportation sector is now responsible for more global warming emissions than any other, governments must expand tax incentives that make EVs—new and used—more affordable and to accelerate the transition to electric cars and trucks.

Many UCS staff members have been motivated to seek out such rebates and incentives and are now driving EVs themselves. UCS Web Director Chris Bliss says he managed to buy a $34,000 all-electric Kia Niro by taking advantage of federal and state tax breaks amounting to $10,000, and then spent another $1,000 to install a 220-volt charger outside his house—for a total out-of-pocket cost of $25,000. Colleen MacDonald, host of the UCS *Got Science?* podcast, says she expects to receive the same rebates on her new $39,000 Nissan Leaf S Plus when she files her 2022 taxes next year. But she also notes that many EVs are more expensive than hers and that because of manufacturing "caps"—the federal EV tax credit expires after a manufacturer sells 200,000 vehicles—not every EV is eligible for a rebate.

CHARGING CHALLENGES

Charging—and the question of how far a vehicle can go on a charge—also remains a concern for potential EV drivers. Depending on battery size and the price per kilowatt-hour of electricity, a full charge will normally cost a small fraction of what it takes to fill up a gas-powered car's tank. But things get trickier if drivers don't have a garage or a driveway, or their apartment's parking lot doesn't have chargers. UCS Senior Engineer Maria Cecilia Pinto de Moura rents a house in a Maryland suburb of Washington, DC, but doesn't have access to the driveway, so she plugs her 2020 Chevy Bolt, parked on the street, into a 120-volt

Photo: City of New York

> *Charging the average EV in this country for driving now produces global warming pollution equivalent to a gas-powered vehicle getting about 93 miles per gallon.*

outlet on the outside of the house. Though it's the slowest of the available charging options, adding only four to five miles of range per hour, she says it works for her. "This is a city car," she explains. "I haven't taken it on long trips yet, but with its 300-mile range and the growing number of public chargers along highways, I'm not worried about it."

Most EV drivers can also charge their vehicles at public fast-charging stations, which can provide an 80 percent charge in 30 to 75 minutes, but they can be hard to find. "We obviously need more chargers, especially for multi-unit housing and rental units," says UCS Senior Vehicles Analyst Samantha Houston. "That's why federal, state, and local funding—including what Congress provided in the bipartisan infrastructure law to work toward the goal of 500,000 public chargers—is so critical. With that kind of money in hand, the question of how fast we can ramp up will really come down to how quickly state and federal programs can dedicate funds for charging sites and the extent to which municipalities, utilities, and installers can streamline the process."

As more charging stations are installed in cities and along highways, so-called "range anxiety" (concerns about the distance an EV can go between charges, and the availability of stations) will surely dissipate. Some EVs are already meeting and even exceeding the range of gasoline vehicles. UCS Director of Climate Science Brenda Ekwurzel reports that, at the end of 2018, she bought a Tesla Model 3 with a range of about 300 miles. To visit family in Pittsburgh, roughly 225 miles from her home in a Washington, DC, suburb, she will occasionally choose to stop at a Tesla charging station along the route. "It takes only 15 minutes to charge the car with a fast charger," she says. "So we get out, plug it in, stretch our legs, get a cup of coffee, and then we're back on our way."

BE PREPARED TO WAIT

Global supply chain shortages for computer chips and other key components, along with high gas prices intensifying consumer interest, have affected the availability of EVs. Models are often hard to find and many manufacturers have marked up prices. It's not uncommon for dealers to require deposits well in advance of tentative delivery dates, and waiting lists for some models are now more than a year long.

Colleen MacDonald didn't have to wait for her car in early 2022, though she spent a few weeks doing research before she settled on the Leaf. If she'd had to contend with shortages, she says, the wait would have been worthwhile.

"It's so much fun to drive," she says. "The pickup is so fast compared to a gas-powered car. And we just plug it in at night like I plug in my phone. I love this car." {C}

REASONS TO GO ELECTRIC

TO IMPROVE PUBLIC HEALTH.
Transportation, including our cars and trucks, accounts for more than half of this country's toxic air pollution.

TO COMBAT CLIMATE CHANGE.
The transportation sector today accounts for nearly a third of US carbon emissions, edging out the electric power sector as the top source of global warming pollution.

TO SAVE MONEY.
The sticker price of plug-in vehicles is generally more expensive than that of comparable gas vehicles, but federal and state tax incentives can make them cost-competitive; they're also cheaper to "fuel" and maintain. Switching to an EV can also help drivers shield themselves from the volatility of gasoline prices.

On top of all that, EVs are fun to drive. Press down on the accelerator and they take off like a rocket!

Photo: Heather Tuttle/UCS

A UCS Scientist Helps Give Voice to California's Marginalized Communities

By Pamela Worth

When Pablo Ortiz began to research an unassuming stretch of California's Central Valley, he didn't know he was about to stumble on a set of interconnected challenges that would turn him into one of the region's most vocal advocates.

A senior climate and water scientist at the Union of Concerned Scientists who lives and works in California, Ortiz says his initial interest in the San Joaquin Valley was purely hydrological. Many people in the region lack access to clean drinking water, and Ortiz, whose PhD is in hydrology and water resources management, was searching for ways he could lend his expertise to community groups confronting that issue.

"In my initial interviews with community members, I was only asking about water," he says. "But very quickly, the topic changed. People would say, 'Yes, water pollution is bad, but the air quality is worse. There are no streetlights or sidewalks, public transportation is horrible, and the closest grocery store is in a gas station a mile away.' It became clear to me that solving the water crisis wouldn't make living conditions that different."

Ortiz began thinking about the San Joaquin Valley more holistically. In collaboration with Angel Fernandez-Bou, a UCS Science Network member, postdoctoral researcher, and lecturer at the University of California–Merced, Ortiz began to seek out projects that might address more than one facet of the challenges residents face.

UNEVENLY SHARED PROFITS AND PROBLEMS

Located between the Coast Ranges and the Sierra Nevada, the San Joaquin Valley is home to about 4 million people across eight counties. Its farmlands make it the most productive agricultural region in the United States, yielding crops including almonds, beets, grapes, oranges, tomatoes, and walnuts, as well as 90 percent of California's milk production.

"Regardless of where you live in the country, it's most likely that some of the food you eat every day was grown in the San Joaquin Valley," says Ortiz.

The wealth generated from the valley's massive agriculture operations is shared by few. Ortiz says jobs are physically demanding, wages are low, and most farmworkers live in harsh conditions. Industrial agriculture depletes surface and groundwater reserves, drying up community wells, and fertilizers and pesticides pollute groundwater, forcing people to buy bottled water.

Fossil fuel extraction also propels the valley's economy. And the air pollution from large agricultural and fossil fuel operations—along with exhaust from the big rigs that move goods throughout California and smoke from wildfires—lingers between the mountain ranges, affecting everyone who lives in the San Joaquin Valley. Several counties in the valley have the worst air quality in the nation.

Climate change also burdens communities in the valley. Its summers are becoming hotter and drier, compounding water scarcity and putting outdoor workers at risk for heat stroke and death.

"These are the people on the front lines of climate change," says Ortiz. "And because of a lack of political representation, and the dynamics of who has power and who doesn't, they're being ignored."

EXPERTISE IN DEMAND

To address some of the issues faced by people living in the San Joaquin Valley, one of the first projects Ortiz

Photos: Lance Cheung/USDA (tractor); Abby Figueroa/UCS (Pablo Ortiz); Courtesy KBAK/KBFX (haze)

Pablo Ortiz (above) speaks with Angelina Aguilar, who lives in the city of San Joaquin, about our toolkit describing climate impacts in the region. Aguilar has experienced water contamination at her home; drought and air pollution also plague communities in this key agricultural region.

and Fernandez-Bou took on (along with collaborators from UCS and other organizations) was an educational guide published in English and Spanish in 2020. It explains the local effects of climate change and how they could affect people's health and livelihoods, and provides strategies for people to improve their households' resilience and to advocate for change. (You can find the report online at www.ucsusa.org/resources/climate-change-san-joaquin-valley.)

"We've had people asking for more guides, in both languages," says Ortiz. "People are relying on it."

Next, Ortiz was recruited to help complete a state report on how climate change affects the valley. He and the other authors released the report in January 2022.

Ortiz has also been tasked with reviewing state agencies' plans for preserving the groundwater that many Californians rely on for drinking water, which is threatened by drought and agricultural overuse. His feedback centers the need to incorporate climate change into these plans.

THE COMMUNITY'S NEEDS COME FIRST

There are a number of local groups advocating for holistic solutions to the challenges facing the San Joaquin Valley, and Ortiz stresses the importance of community-led problem solving. Outsiders can fall into the common trap, he says, of making assumptions about people and communities' needs without asking or collaborating with those most affected by the problems they're trying to address.

"I've seen organizations offer grant funding for communities in the valley," he says. "But many of the most in-need communities don't know how to apply for them—or the information provided is only in English. It can be frustrating."

Ortiz plans to keep working with Fernandez-Bou and other collaborators in the San Joaquin Valley to inform communities about climate change risks and adaptation strategies—and to advocate on behalf of the valley to the media, policymakers, other scientists, and anyone who will listen.

"There are solutions that have been developed and agreed on by the most affected communities," he says. "If you care about how climate change is affecting your own life, if you care about the food you eat, you should care about the San Joaquin Valley." {C}

To learn more about ***Pablo Ortiz's*** *work, visit* https://blog.ucsusa.org/series/climate-change-in-californias-central-valley.

Committed to Service and Defending Science

During their long military careers Jane Ward and Steve Waller, pictured above in 2002, served as physicians for US military pilots and other aviation personnel.

After retiring from careers in the US Air Force as flight surgeons and ophthalmologists—along with numerous other endeavors—Jane Ward and Steve Waller now live on Cape Cod, Massachusetts. Military service has been part of their lives since they enlisted as young adults, and as they approach their 50th wedding anniversary, they remain focused on serving their community. He teaches courses online for a military medical school; she serves as vice-chair of their county's volunteer infrastructure and energy committee—and they both set aside time to spend with their daughters and grandchild.

"I don't think either one of us could just put our feet up," Ward says of retirement. "There's more opportunity now for us to give back and to be involved. I don't even sit down very much during the day."

Waller and Ward want to be part of the solution to the challenges they observe in the world, so as medical professionals, they have helped educate friends and community members about COVID-19, and they strive to live sustainably within their fragile local ecosystem. They've installed solar panels on their home, purchased a low-emissions car, and volunteered for local organizations working on green initiatives. And with an eye to the future, they've made the gift of a charitable annuity to the Union of Concerned Scientists—a tax-deductible donation of assets that provides donors a fixed stream of income for the rest of their lives.

The couple is interested in UCS analysis and advocacy around voting rights, clean transportation, and water policies. And with their backgrounds in medicine, Ward says, they especially care about preserving the role of science in the federal government. "I don't remember feeling as horrified about the need to actually defend science in our lifetime as in the last four or five years," she says. "UCS seems to have a good impact lobbying on behalf of science.

"We want to make sure we spend our money so that it goes to support the causes that we care about the most. Organizations like UCS are doing so much good." {C}

On the Road to 100 Percent Renewables

(continued from p. 11)

Similarly, states should prioritize the accelerated reduction of emissions in communities overburdened by pollution, and make sure these communities are fully involved in decisionmaking about the policies that affect them, including proposals to retire fossil fuel plants or to build renewable energy infrastructure.

While each state's path to 100 percent renewable energy will differ depending on its electricity mix, regulations, and expected wind and solar capacity, *On the Road to 100 Percent Renewables* emphasizes that there is great potential to drive change locally in ways that can help lift communities out of poverty and pollution and build wealth in the clean energy economy.

A NATIONAL STANDARD NEEDED

While our report points the way for the USCA states, which represent a large portion of the country, it also underscores the reality that many states still have not fully committed to clean energy, choosing instead to build additional gas power plants or import fossil-fueled electricity generation to meet their demand. States and regions that rely heavily on gas generation are at risk of shortages and extreme price fluctuations.

To avoid these pitfalls, states should avoid investments inconsistent with the need to remove heat-trapping emissions and air pollution from the power sector (and the economy as a whole), and should enact policies that reduce the risks of overreliance on gas. The best strategy would be to adopt a nationwide clean energy standard—a goal that is politically challenging at a moment when the US Supreme Court has agreed to hear arguments from 19 mostly coal-producing states and coal companies seeking to crush the Environmental Protection Agency's legal power to regulate heat-trapping emissions altogether.

> ***In the absence of federal leadership, states offer one of our best hopes for transitioning to an equitable clean energy future.***

The latest UN Intergovernmental Panel on Climate Change assessment report (see p. 5) clearly shows that world governments are falling abysmally short of what's needed to avoid catastrophic consequences for humanity and the ecosystems we depend on. It also predicts surging economic damage to so-called frontline communities, which are usually home to the most vulnerable and marginalized people.

Our analysis demonstrates not only that it is entirely feasible for USCA states to commit to meeting 100 percent of their electricity needs from renewable sources, but also that the United States needs to make a *comprehensive* commitment to clean energy. In the absence of national action and leadership, states offer one of our best hopes for transitioning to an equitable clean energy future—and we will use this new analysis to help steer them in the right direction. {C}

Photos: Dennis Otlink/Unsplash (ad); Dennis Schroeder/NREL (wind turbine)

Tyson Is Too Big for Our Own Good

By Karen Perry Stillerman

New analysis by the Union of Concerned Scientists estimates the extent to which Tyson Foods, the United States' largest meat and poultry producer, holds sway over farmland. It takes nearly 10 million acres to grow the corn and soybeans fed to chickens, hogs, and cattle in Tyson's supply chain—that's an area nearly twice the size of New Jersey.

Why does this matter? Corn and soybeans take up more than half of this country's total cropland, and the dominant way those crops are grown is anything but sustainable. It relies on the overuse of fertilizers that contribute to climate change, pollute drinking water, and produce coastal "dead zones," uninhabitable for marine life. Plus, the damage it does to soil leaves farms and surrounding communities more vulnerable to drought and floods.

This status quo threatens to lead our food system to disaster. Tyson has the size to help us avoid that outcome, but isn't doing nearly enough. After committing in 2018 to achieve "improved environmental practices" on 2 million acres of cropland (about 20 percent of the total under its influence), the company dropped the ball: by 2021, it had taken initial steps on just 408,000 acres. Tyson is thwarting the changes we need by choosing not to support them.

Moreover, Tyson's unchecked size and power enables it to engage in numerous abusive practices while earning record profits. It has been sued for price fixing and toxic spills. It was accused early in the pandemic of lying to its workers about the dangers of COVID-19 and then went on to force employees to work six days a week regardless of whether they were ill—or risk being fired. And the company employs a stock structure that allows the Tyson family to vote down any and all calls for change made by other shareholders.

TYSON FOODS' FARMLAND FOOTPRINT

Tyson uses nearly 10 million acres of farmland to grow feed for its animals. It committed to more sustainable practices on about 20 percent of that land, but has taken action on less than 5 percent so far.

For all these reasons, federal regulators should take bold action to rein in Tyson and its ilk. With stronger enforcement of antitrust laws and continued investment in smaller meat and poultry processors, the Biden administration can decrease Tyson's power by increasing competition. Congress and the US Department of Agriculture should also boost investments in conservation and research programs that help farmers producing corn and soybeans—often used for feed—adopt more sustainable practices. You can learn more about our recommendations at www.ucsusa.org/resources/tysons-need-feed.

Tyson must also get serious about its stated commitment to sustainability. By setting high standards and providing incentives for the farmers in its supply chain to manage their land differently, Tyson could move US agriculture in a positive direction. In the process, it could become a force for good: by working to protect our land, soil, water, and climate, and the people everywhere who depend on them. {C}

Karen Perry Stillerman *is the senior strategist and senior analyst in the UCS Food & Environment Program. Read more from Karen on our blog,* The Equation, *at* http://blog.ucsusa.org.

Photos: Sanjay Suchak (Karen Perry Stillerman); Outdoor Homie/Diversity Photos (ad); Illustration: Nick Iannaco/UCS

Union of Concerned Scientists

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