THE DEVASTATING HEALTH IMPACTS OF CLIMATE CHANGE

HEARING

BEFORE THE

COMMITTEE ON OVERSIGHT AND REFORM HOUSE OF REPRESENTATIVES

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THE DEVASTATING HEALTH IMPACTS OF CLIMATE CHANGE

Wednesday, August 5, 2020

HOUSE OF REPRESENTATIVES,
COMMITTEE ON OVERSIGHT AND REFORM,
Washington, D.C.

The committee met, pursuant to notice, at 11:19 a.m., via WebEx, Hon. Carolyn B. Maloney [chairwoman of the committee] presiding.

Present: Representatives Maloney, Norton, Lynch, Connolly, Krishnamoorthi, Raskin, Rouda, Khanna, Mfume, Wasserman Schultz, Sarbanes, Kelly, DeSaulnier, Plaskett, Pressley, Porter, Comer, Gosar, Massie, Hice, Grothman, Palmer, Gibbs, Higgins, Miller, Green, and Keller.

Chairwoman MALONEY. The committee will come to order.

Without objection, the chair is authorized to declare a recess of the committee at any time.

I now recognize myself for an opening statement.

Good morning. Today's hearing is about the climate crisis that our Nation faces. It is a crisis that is already harming the health of Americans. It is a crisis that our children will inherit. And if our government does not act now, it will result in tragedy on a vast scale.

But the good news is that there is still time to act. And the experts here today will explain how our Nation, our economy, and the health of the American people all stand to benefit from decisive action limiting climate change.

I've called this hearing today, even though there are many important things we are all working on this week, because handling one crisis does not negate our responsibility to face another one. We owe it to our constituents, to each over, and to future generations to take action on climate change now.

I'm eager for this committee to hear from our panelists today. We will be learning about groundbreaking new research, some shared with the world at this hearing for the very first time. This research highlights the very real impacts of climate change and air pollution on American lives over the next century.

We will have the opportunity to learn from all of this. And I just want you to know that the witnesses are—that are before us today are ringing the alarm bell, and the House Oversight Committee is hearing.

Unfortunately, as with the coronavirus pandemic, the President's actions have actually made the problem of climate change worse.

President Trump has directed his administration to dismantle efforts to save our planet. He has rolled back clean air and clean water protections. He withdrew the United States from the Paris Agreement, a global commitment to keep warming under 2 degrees Celsius.

When announcing the withdrawal, Trump stated, and I quote, "As President, I can put no other consideration before the well-being of American citizens," end quote. Yet the President's actions put the health of Americans at further risk. Lives are lost due to climate change. And because of increased disease, these actions also increase the cost of healthcare.

By contrast, Democrats in Congress have relentlessly pushed for reforms. For example, last year, in February 2019, I, along with numerous colleagues here on Oversight Committee, cosponsored H.R. 109, legislation recognizing the Federal Government's duty to create a Green New Deal to end our country's reliance on fossil fuels.

Our committee is also actively working on legislation to reduce the Federal Government's environmental footprint. This work includes a bill to require the Postal Service to transition to a 100-percent emissions-free vehicle fleet by 2040. This will ensure that the Postal Service has the tools necessary for its mission while making our air cleaner.

I am deeply committed to making this a reality and to pursuing additional legislation within the jurisdiction of our committee to combat climate change.

Congress has a duty to lead in this crisis. I am honored to be chairing this hearing today, and I am honored to be listening to this distinguished panels of scientists, researchers, and doctors. And I am glad my Republican colleagues are participating, as this is a challenge we face together.

Thank you all for being here.

I now recognize the distinguished ranking member, Mr. Comer, for an opening statement.

Mr. COMER. Thank you, Chairwoman Maloney.

And I thank the witnesses for their willingness to appear before the committee to discuss the health impacts of climate change.

I would like to begin by discussing the progress that the United States has made on climate change. We are leading the world in reducing emissions, having reduced more than the next 12 emission-reducing countries combined. Because these reductions have come via innovation and market forces, energy costs have decreased.

This summer, EPA released its annual air quality report. Under the leadership of President Trump, from 2017 through 2019, criteria air pollution and emissions have dropped seven percent. Due to these falling emissions, the U.S. saw a marked improvement in air quality. The number of days listed as unhealthy for sensitive groups in the Air Quality Index dropped by 34 percent from 2017 to 2019.

The United States also saw the largest decrease of any country in energy-related CO2 emissions in 2019. Energy-related CO2 emissions fell 2.9 percent in 2019. U.S. emissions are now down al-

most 1 gigaton from their peak in the year 2000. This is the largest absolute decline by any country over that period.

Not everything is declining, unfortunately. The mental health impacts regarding the fear of climate change are growing at a staggering rate. A survey of 30,000 people worldwide found that nearly all of the people surveyed believed climate change would make humanity extinct.

Children have been impacted by the fear of climate change as well. The American Psychological Association stated that there were—they were aware of reports that children are increasingly suffering from eco anxiety.

I hope that our committee can move past doomsday scenarios and headlines and focus on the energy policy steps we should be taking and what their costs and impacts are.

According to a study performed by The Heritage Foundation, one part of the Green New Deal would cost an average family $165,000 and wipe out 5.2 million jobs with negligible climate benefit.

I fear that a premature move away from fossil fuels, particularly for poorer areas, means that they will continue to have little access to the type of cheap, reliable energy that enables economic growth, that allows for the provision of clean water and sanitation, widespread vaccination, and preventative child health services.

As I have said before, coal mining is a way of life in many parts of America, including my district. Kentucky coal remains an important component of the Commonwealth's economy and America's powerful energy portfolio.

Kentucky was the fifth-highest coal producer in the U.S. in 2018, mining 39.7 million tons of coal. In that same year, coal mines directly employed more than 6,400 Kentuckians, and mining indirectly contributed billions of dollars to Kentucky's economy. Both the first-and second-largest coal-producing counties, Union and Hopkins, are in my congressional district.

The United States is blessed with abundant clean-energy natural resources. We must use those resources to advance American interests and continue to reduce emissions. I look forward to working with the majority to drive energy and environmental innovation in ways that are beneficial to everyone.

Thank you, Madam Chairman. And thank you again to today's witnesses.

I yield back.

Chairwoman MALONEY. I now recognize Mr. Rouda for an opening statement.

Mr. ROUDA. Chairwoman Maloney, did you just recognize me?

Chairwoman MALONEY. Yes, I did. Yes, I did.

Mr. ROUDA. Thank you. Thank you, Chairwoman Maloney, for the opportunity to give an opening statement, and thank you for holding this important hearing.

As chair of the Subcommittee on Environment, climate change has been front and center among my priorities. Over the course of the 116th Congress, our subcommittee has held a series of hearings focused on climate change.

We've explored the early scientific consensus regarding climate action, a reality confirmed in the 1970's and 1980's by in-house scientists at major fossil fuel companies such as Exxon and Shell and

later denied by those same companies once they started getting concerned that climate action would hurt their bottom line.

In subsequent hearings and briefings, the subcommittee laid out the devastating consequences of climate change on public health, how climate change is causing more frequent and severe natural disasters, and how climate change has already impacted our economic well-being.

What we have learned from this substantial work is that climate change can no longer be thought of as something that may or may not impact us someday. We are already experiencing the negative impacts as a result of decades of inaction. And people across our country and around the world will continue to suffer for decades to come if we continue down this path of inaction.

Now, let's be clear: Those focused on inaccurately downplaying real climate risk have blood on their hands. These efforts are deeply problematic and counterproductive. We cannot simply cherry-pick information to fit whatever narrative suits our desires or industry bottom lines.

In my opinion, engaging in ongoing climate denial efforts, in clear contradiction of decades of scientific evidence, is on par with the current administration's efforts to shrink responsibility for over 155,000 Americans who have lost their lives as a result of widespread misinformation and a distrust and disregard for science by leaders of this country.

As detailed in the Trump administration's own Fourth National Climate Assessment, the economic consequences of climate change are serious and far-reaching. According to this assessment, climate change could slash up to one-tenth of gross domestic product by the year 2100. To put that in perspective, that's more than double the losses we experienced in the 2008 Great Recession.

Instead of seizing upon these findings and other dire public health warnings expressed in this assessment in order to ensure a livable world, instead, the Trump administration has worked tirelessly to undermine the efforts of previous administrations. In fact, as of July 15, 2020, the Trump administration has officially reversed, revoked, or otherwise rolled back 68 major environmental policies, rules, and regulations, with 38 additional rollbacks still in progress.

The Trump administration's anti-climate actions create serious negative economic consequences for the short-term and long-term future of every American. We must do more to protect the health and safety of all Americans, especially amid the ongoing coronavirus pandemic.

In fact, a Harvard University study published in April 2020 found that an increase of just one microgram per cubic meter of pollution is associated with an eight-percent increase in the death rate due to the coronavirus.

The study also found that COVID–19 mortality rates were higher in areas that suffered from long-term pollution, including low-income communities and communities of color. The same causes of climate change are exacerbating the effects on our public health and the economic crisis caused by the coronavirus pandemic.

The testimony from our experts who have joined us today, including the testimony of Dr. Drew Shindell and Dr. Michael

Greenstone, who will testify to new and alarming figures regarding the cost of inaction on climate change, further underscores the urgent need for congressional action to pass major climate legislation.

It could not be clearer: Climate change is an existential problem. It literally threatens all aspects of our collective existence as a human race—our health, our livelihoods, and our ability to survive and rebuild from the tragedies inflicted by nature.

We hear a lot about the generational divides in American politics today, but there's one thing that has always united us: Each generation wants their children to live better, happier, healthier, and more prosperous lives than they did. If that does not happen, it feels like a reversal of the natural order.

It makes me sick to think that my children and my children's children will soon be standing at the dawn of a new century, looking back at all of us, wondering why didn't we take the threat of climate change seriously, why we knew and did nothing. Did we not think they were worth it?

For these reasons, giving up and turning away from a problem is simply not an option. Collective action in the face of a rapidly changing world is tough, yes, but, in the words of President John F. Kennedy, speaking of our Nation's efforts to reach the Moon, we choose to pursue great actions, quote, "not because they are easy, but because they are hard; because that goal will serve to organize and measure the best of our energies and skills; because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win."

Last October, former California Governor Jerry Brown testified before the subcommittee on the current administration's rollback of the Obama-era clean cars rule, and he urged all of us, quote, "Let's get it done. Pass the laws, block the stupidity, and get back on the side of science and the environment."

We do not have time to waste. The existential challenge and unprecedented moment requires extraordinary action, and it's both the political and moral will to do the right thing. Let us be on the right side of history, not just for ourselves, but for our children, our grandchildren, and all future generations.

Thank you, Chairwoman Maloney, for this opportunity, and I yield back.

Chairwoman MALONEY. Thank you so much.

Now, I would like to introduce our witnesses.

Our first witness today is world-leading climate scientist Dr. Drew Shindell, the distinguished professor of Earth sciences at Duke University. Dr. Shindell was previously at the NASA Goddard Institute for Space Studies and served as the coordinating lead author on two key intergovernmental panels on climate change, one in 2013 and one in 2018.

Then, we will hear from Dr. Michael Greenstone, Milton Friedman distinguished service professor in economics at the University of Chicago. Dr. Greenstone is also the director of the Becker Friedman Institute and the Interdisciplinary Energy Policy Institute, also at the University of Chicago. He previously served under President Obama as the Chief Economist for the Council of Economic Advisers.

Next, we will hear from Dr. Neeta Thakur. Dr. Thakur is an adult pulmonologist and critical care physician at University of California, San Francisco. She is the medical director at the San Francisco General Hospital Chest Clinic at the University of California, San Francisco. And she is the chair of the Health Equality and Diversity Committee at the American Thoracic Society.

Then, we will hear from Dr. Renee Salas, a practicing emergency medicine physician in the Department of Emergency Medicine at Massachusetts General Hospital, an assistant professor of emergency medicine at Harvard Medical School, and a Yerby fellow at the Center for Climate, Health, and the Global Environment at the Harvard T.H. Chan School of Public Health.

Finally, we will hear from Michael Shellenberger, who is the president and founder of Environmental Progress.

The witnesses will be unmuted so that we may swear them in.

Please raise your right hands.

Do you swear or affirm that the testimony you are about to give is the truth, the whole truth, and nothing but the truth, so help you God?

Let the record show that the witnesses answered in the affirmative.

Thank you.

Without objection, your written statements will be made part of the record.

With that, Dr. Shindell, you are now recognized for your testimony. Dr. Shindell?

STATEMENT OF DREW SHINDELL, PH.D., NICHOLAS DISTINGUISHED PROFESSOR OF EARTH SCIENCE, DUKE UNIVERSITY

Mr. SHINDELL. Chairwoman Maloney, Ranking Member Comer, and members of the committee, good morning, and thank you for inviting me to testify today.

Our Nation faces multiple challenges, including the ongoing climate crisis, poor health for many Americans along with enormous medical spending, unprecedented job losses, and systemic inequality.

Though seeming disparate issues, these problems are all connected. In particular, the burning of fossil fuels that is the primary driver of climate change is also responsible for the majority of deadly air pollution in the U.S., while transitioning to alternative energy sources would not only improve the environment but would create jobs and reduce the disproportionate suffering from climate change and air pollution that falls upon the most vulnerable, exacerbating inequalities.

In this testimony, I present the results of new research by my group at Duke University and NASA colleagues on the health and economic benefits to Americans if the world meets the objectives of the Paris Climate Agreement and keeps global warming below 2 degrees C.

This new work is the first to incorporate recent advances in understanding of public health, which reveal much larger benefits than in prior studies, in a consistent evaluation of the impacts of

both the climate and air quality changes resulting from aggressive policies to mitigate climate change.

I can provide the committee with results for all the contiguous 48 states and major metropolitan areas throughout the country. Here, I focus on national totals.

We find that, over the next 50 years, keeping to the 2-degree pathway would prevent roughly 4–1/2 million premature deaths and about 3–1/2 million hospitalizations and emergency room visits. These large impacts reflect our updated understanding of the severe toxicity of air pollution and the dangers of heat exposure. Although it does not appear on death certificates, pollution is indirectly responsible for a large fraction of heart diseases and respiratory diseases.

The economic value of these avoided deaths is more than $37 trillion. The avoided healthcare spending due to reduced hospitalizations and emergency room visits exceeds $37 billion.

Older people, children, and the poor are particularly vulnerable to both air pollution and heat exposure, so the adverse impacts fall disproportionately on the most vulnerable and on minority populations.

Benefits of action extend beyond health. Ask a delivery truck driver how easy it is to get their job done when it's 108 degrees Farenheit. Find a construction worker hammering down a roof in the blazing sun in Texas and ask them how well they work when it's 110 and humid. Ask a worker on a farm or on a giant factory floor too large to be air-conditioned how many breaks they'll need when temperatures rise even further in the summertime. People cannot work if they are directly affected by heat or dirty air but also when they are caregivers for children or elderly made sick by their environment.

Our analysis finds that a 2-degree pathway leads to more than 300 million additional workdays that would otherwise have been lost due to air pollution and heat for American businesses, valued at more than $70 billion.

The environmental costs of climate change and air pollution are also passed on to all businesses, who pay in their higher health and damage insurance costs. On average, we find more than $700 billion per year in benefits for the U.S. from improved health and labor alone—far more than the cost of the energy transition.

Furthermore, renewable electricity sources, such as solar and wind, and energy-efficiency programs create far more jobs per unit of energy produced or saved than fossil fuels, making the transition better for workers too. Hence, it's not a question of choosing the environment or the economy; it's choosing a healthy environment and a strong economy or a polluted environment and a weaker one.

Because many health benefits come from clean air, our research also shows that U.S. action alone would bring us more than two-thirds of the health benefits of worldwide action over the next 15 years. Hence, while it is unquestionably true that tackling climate change requires the nations of the world to work together, it is also true that the bulk of the near-term benefits we stand to receive from addressing climate change will come from our own policies.

As we've seen with the coronavirus lockdown, air pollution responds immediately to emissions reductions. Therefore, we find

that roughly 1.4 million lives could be saved from improved air quality during just the next 20 years.

Shifting to a two-degree pathway could reduce the toll of air pollution, which leads to nearly 250,000 premature deaths per year in the U.S., by 40 percent in just a decade. Our work shows that climate action now means benefits now.

Thank you.

Chairwoman MALONEY. Dr. Greenstone, you are now recognized for your testimony. Dr. Greenstone?

STATEMENT OF MICHAEL GREENSTONE, PH.D., MILTON FRIEDMAN DISTINGUISHED SERVICE PROFESSOR IN ECONOMICS, THE COLLEGE, AND THE HARRIS SCHOOL, DEPARTMENT OF ECONOMICS, UNIVERSITY OF CHICAGO

Mr. GREENSTONE. Thank you. Thank you, Chairwoman Maloney, Ranking Member Comer, and members of the committee, for——

[Audio interruption.]

Mr. GREENSTONE. Should I start?

Chairwoman MALONEY. Would people mute their contact? Because there's talking in the background.

Dr. Greenstone let's try now.

Mr. GREENSTONE. OK, great.

Thank you, Chairwoman Maloney, Ranking Member Comer, and members of the committee, for inviting me to speak today. I appreciate the opportunity to speak with you about the temperature impact from climate change on public health and our economy.

The temperature impact on mortality is likely to be one of the dominant costs of climate change. And because today's emissions will stay in the atmosphere for hundreds of years, knowing the damages it will cause will be essential to taking the action we need to prepare for these risks.

So, what impact will climate-induced temperature changes have on public health, and how much will it cost? This is a topic of a new paper that I released with some colleagues on Monday. Since the paper is 145 pages long, I thought that I would use my time to summarize its findings.

I want to emphasize its headline finding up front, though. The results indicate that the mortality risks from climate-induced temperature changes are at least an order of magnitude larger than we had previously understood. With this headline in mind, there are four main points that come out of my written testimony.

No. 1, our research discovered that a high emissions trajectory increases global temperatures by about 4.8 degrees C relative to preindustrial temperatures by 2100. And this increase is projected to raise global mortality risk by about 85 deaths per 100,000 people by 2100.

No. 2, in the United States, the projected increase in mortality risk from higher temperatures will be about 10 deaths per 100,000. And that's about on par with the current fatality rate for modeling.

Another key finding is that the risk in the United States differs from place to place. I've included a table in my written testimony with the data for each of your districts to give a sense of the risk your constituents are projected to face. Some examples might be instructive.

In my home city of Chicago, which includes the districts of two Representatives on the committee, the mortality risk is projected to actually degrees by about 35 lives per 100,000 by 2100. That's because my city typically sees a lot of very cold winter days, and those days tend to be deadly. Over time, however, we'll see fewer of those cold days, which decreases mortality risk during the winter, and that will outweigh the risk of more hot days, giving Chicago a net benefit.

In contrast, other places will be harmed. The Washington, DC, area, which includes the districts of Representatives Raskin and Norton, is projected to experience a higher mortality risk under this scenario—around 33 deaths per 100,000 by 2100. In Winston-Salem, which includes the district of Representative Foxx, it's 35 deaths per 100,000. Kenton County, Kentucky, which includes the district of Representative Massie, is projected to increase by about 28 deaths per 100,000.

In all of these cases, the increased mortality risk is higher than the current U.S. mortality rate for diabetes, for the flu, and pneumonia.

No. 3, this is the projected future if we follow a high-emissions trajectory. However, the level of emissions is not a law of physics; it is a reflection of policy choices. And here, the news is very encouraging. Bringing global emissions down to moderate levels, not even as low as the Paris Agreement's long-term targets, would reduce the attendant mortality risk by about 84 percent compared to the high-emissions pathway that I just discussed.

Under this moderate-emissions scenario, climate-induced temperature changes are projected to be responsible for 14 additional deaths per 100,000 globally at the end of the century. That's down from 81. In the United States, that risk would decline from about 10 to 1 per 100,000, eliminating almost all of the mortality risk.

No. 4, we estimate that the release of an additional metric ton of CO2 will cause about $37 worth of mortality damages. This finding is more than five times larger than the Trump administration's full social cost of carbon, reflecting their claim about damages across all sectors. It is also about 75 percent of the Obama Administration's global cost of carbon that had relied on previous research.

All of this makes clear that it is absolutely critical that the social cost of carbon is updated, following the National Academy of Sciences' 2017 recommendations, so that it is on the frontier of scientific and economic understanding and can serve as a more accurate guidepost for climate policy.

In conclusion, the mortality risks from climate change are substantial. However—not just substantial—larger than we had previously understood. However, policy has the potential to deliver some of the most significant public health gains in history. That's within our grasp.

Given the scale of the climate change in front of us, we would be well-served to be disciplined in seeking out the most efficient and least expensive reductions in greenhouse gases available.

Thank you for allowing me to speak today. I look forward to your questions.

Chairwoman MALONEY. Thank you.

Dr. Thakur, you are now recognized for your testimony.
Dr. Thakur?
Is she there?

STATEMENT OF NEETA THAKUR, M.D., MEDICAL DIRECTOR, ZUCKERBERG SAN FRANCISCO GENERAL HOSPITAL CHEST CLINIC, UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

Dr. THAKUR. Hello? Are you guys able to hear me now?
Chairwoman MALONEY. Yes, we can.
Dr. THAKUR. OK. I'm not sure what happened. I apologize for that. Thank you for having me today.

I'm a pulmonary and critical care physician at the University of California, San Francisco. I'm the medical director of the Chest Clinic at our county hospital. I am also a physician member on the Climate Change Coordination Committee for the San Francisco Department of Public Health and a scientist who studies the effects of air pollution on children and adults. Most importantly, I'm also a mom to two children, and I worry about how climate change will impact my children's health, especially my son, who is eight years old and has asthma and severe allergies.

You've heard previous testimony at this hearing and at others about the science of climate change. To many, climate change feels like a concept or something that is happening that is invisible and not felt at the individual level.

Today, I want to use my time to share with you my patients' stories—my patients who are the most vulnerable—the elderly, those with chronic medical conditions, and those from historically disadvantaged communities—and how climate change is impacting their health.

Right now, today, we are experiencing extreme heat across the country. This is especially concerning as we're in the midst of the coronavirus pandemic, which is crippling our usual mechanisms—that is, the use of cooling centers, libraries, and malls—to combat the effect of extreme heat.

This is not new, and it's only becoming more frequent. In September 2017, San Francisco set a new record-high temperature of 106 degrees. For many, these days were hot, uncomfortable, and inconvenient, but for my patients, their health was in jeopardy due to extreme heat.

For one of my patients, a 68-year-old man with COPD, who is also homebound and cannot afford air conditioning, the record temperatures were causing him severe distress. To escape the heat, he needed to sit in a cool bath and keep a wet towel on his neck to stay cool and to keep his breathing comfortable and to keep him out of the hospital. My patient staying cool was not just a matter of comfort and convenience; it was literally a matter of life and death.

Because of climate change, wildfires in California have turned from a seasonal phenomenon to a year-round threat. One of the most destructive fires on record, the 2019 Camp Fire in Butte County, caused high levels of air pollution across the San Francisco Bay area. The Air Quality Index hit the purple zone. This meant when stepping outside there was a visible haze hanging over the city.

I had to make home calls to my patients to check in with their respiratory status and then had to make the calculated decision to tell them to not come to their appointments with me, knowing that just stepping outside and traveling the short distance to the doctor's office was hazardous to their health.

In one phone call, my patient with severe asthma shared with me that she was scared to go outside and did not know how to protect herself, and despite following the recommendations to stay indoors, her coughing, shortness of breath, and wheezing were getting worse.

My only option was to prescribe her prednisone, or a steroid, to control her symptoms, but this intervention is just a Band-Aid and comes with its own side effects. I could not provide her with the one thing she needed most, which was clean air. Unfortunately, climate-driven wildfires will continue to put clean air out of reach for many of my patients.

Climate change also means more carbon dioxide, which promotes plant growth and pollen production. This is bad for the 30 percent of Americans with seasonal allergies and the eight percent with asthma.

For one of my patients, who works outside in construction, his asthma became so severe due to the prolonged pollen season that he could no longer work. We were able to start him on a twice-a-month injection therapy for his asthma, and, after about a year, he improved so much that he was able to go back to work. Unfortunately, because he was hourly paid, he could no longer come in to his every–2-weeks appointment, and his asthma became severe again, and he is now once again unemployed.

The frequency and severity of allergic illnesses, including hayfever, are expected to increase as a result of shorter winters and earlier and longer pollen seasons. For me, this has meant keeping my son at home from school because his asthma flares during the pollen season.

This also means, at these times, I cannot go to work and care for my patients. I am fortunate that my job allows me to take time off without fear of losing daily income. For my patients who are from low-income communities of color, where asthma prevalence can be two to three times higher than the national average, staying at home from work is not really an option.

Madam Chairperson, Ranking Member, and the committee, five minutes today isn't enough to share with you all the stories of my patients whose health has been hurt by climate change, nor is it enough time to fully describe how climate change is taking a toll on the most vulnerable populations.

Thank you for giving me this time today.

Chairwoman MALONEY. Thank you for your testimony.

Dr. Salas, you are now recognized for your testimony.

STATEMENT OF RENEE N. SALAS, ASSISTANT PROFESSOR OF EMERGENCY MEDICINE, HARVARD MEDICAL SCHOOL

Dr. SALAS. Thank you to Chairwoman Maloney, Ranking Member Comer, and members of the Oversight and Reform Committee, for holding this hearing and inviting me.

I testify before you as a practicing emergency medicine doctor who is both on the front lines of the climate crisis and the COVID–19 pandemic. I have dedicated my professional life to preventing harm and improving health for my patients through my clinical work, where I received my training in Ohio, not far from my home in Michigan, and through my work at the nexus of climate change and healthcare.

I chose emergency medicine because it provides me the unique privilege of treating whoever walks into my department, and it's a beautiful palette of humanity every shift. From the homeless to professional sports players, every life is equally valued and provided equal care.

I am honored to be here today to represent my patients and to bring their often unheard voices to these halls of power, because the decisions that get made here have widespread health ramifications for everyone.

Patients like the young, strong, and otherwise healthy construction worker who had two jobs to support his growing family in record-breaking heat. By the time he arrived at my emergency department, his organs were already failing as we rapidly tried to cool him. His story showcases that no one is invincible.

Or patients like the elderly man whose wife called 911 because he was acting confused. The medic said the temperature in their apartment felt like the Sahara Desert because they had no air conditioning and only one open window. This man's core temperature was 106 degrees Fahrenheit. When I tell this story, I often wonder about his wife, who remained in the apartment that day while her husband was taken to the hospital.

His story underscores that vulnerable populations, like the elderly, poor, certain racial minorities, and children, are currently bearing the brunt of the health harms from climate change, and her story represents those that are left behind.

These patients may seem different in many respects, but they are joined together by one common vulnerability. Both faced death from heatstroke, the most severe form of heat illness and just one of the enormously broad ways in which climate change harms health.

Now, my medical training prepared me to treat patients with heatstroke, but climate change is increasingly threatening the tools that I need to do it, as extreme heat and climate-intensified weather threaten our healthcare infrastructure, power, and supply chains.

Following Hurricane Maria, there was an intravenous saline shortage that even reached my hospital here in Boston. We were forced to ration IV fluids and give patients who didn't meet the severity criteria a bottle of Gatorade. This story highlights the far-reaching implications of cascading failures.

Carbon pollution and the intricately connected air pollution, fueled by the production and use of fossil fuels, is making it harder for me to do my job and disrupting the very healthcare systems that I rely on to provide care to my community when people need it most.

For so many of my patients harmed by climate change, I often feel like I'm putting a Band-Aid on a bullet wound, as I may be

able to improve their symptoms, but then I send them back out my doors without having gone upstream to the root of problem.

The climate crisis is both a meta problem, meaning it underlies other problems, and as a threat multiplier, meaning it makes existing problems worse. Thus, climate change touches everything and is creating headwinds to successfully tackle our Nation's most pressing health challenges today, including the COVID–19 pandemic.

In my emergency department, I can't take just one health problem and place it in isolation when treating a patient. One insult on the body creates new problems and worsens old ones, just like climate change. Thus, we have to take an integrated approach when tackling these problems.

As Members of Congress, you have the power to create real upstream solutions that can address the root causes of climate change and help build the health systems that can prevent illness or death in my patients in the first place.

The pandemic has placed a focus on health issues in our country like never before in our lifetimes and exposed our underfunded public health infrastructure and fragile healthcare systems. More importantly, it has shown us that when we ignore the science and delay action, people die.

So, I urge you to make health the driver of climate action, to recognize that the goal of protecting health is common ground for all of us, to take an integrated approach when seeking solutions for these problems, and to collectively vow to learn from the suffering and loss that we are experiencing with the pandemic and avoid making the same mistake with the climate crisis.

My colleagues and I in the health community are running out of Band-Aids, and our patients need definitive treatments upstream from our exam rooms. But we need your help.

Thank you.

Chairwoman MALONEY. Thank you very much.

Mr. Shellenberger, you are now recognized for your testimony.

STATEMENT OF MICHAEL SHELLENBERGER, ASSISTANT PROFESSOR OF EMERGENCY MEDICINE, HARVARD MEDICAL SCHOOL

Mr. SHELLENBERGER. Thank you very much, Chairwoman.

My name is Michael Shellenberger. I'm founder and president of Environmental Progress. As background, I'm an invited expert reviewer to the Intergovernmental Panel on Climate Change, a Time magazine Hero of the Environment, and I have been and remain a climate activist for the last 20 years.

In the early 20000's, I co-created and advocated for the predecessor to the Green New Deal, which we called the New Apollo Project and which became the $90 billion Federal Government investment in clean energy under President Barack Obama.

I've also been working with climate scientists for the last five years to advocate the continued operation of America's nuclear power plants, which are our largest source of zero-emissions electricity, and yet nuclear plants are at risk of shutting down across the country, raising serious air pollution and public health concerns as well as climate concerns.

I recently authored a new book, "Apocalypse Never," which pushes back against the extremism and alarmism which is causing serious mental health problems, including among adolescents. While my 14-year-old daughter is fine because I explain the science to her, many of her friends don't know if they will live long enough to have children. Half of the people surveyed around the world late last year thought climate change threatened human extinction. There is no scenario for human extinction, nor any apocalyptic scenario, in the Intergovernmental Panel on Climate Change's reports.

I see myself as somebody that—if you were a cancer doctor or somebody who cared about public health, but your colleagues were going around saying that billions of people would die of cancer, that's a problem, and we need to take it very seriously.

I also hope there's a chance to have some real dialog here. Last week, I participated in a hearing by a different House committee, and I had two members of the committee accuse me, make false accusations against me, and then gaveled the hearing to a close without a chance to respond.

I think it's important to look at what the IPCC writes about these issues. And this is something that I object to in some of the things we've already heard. IPCC describes the challenges related to climate change on health, but it stresses that the major factors are, quote/unquote—I'm just going to quote directly from IPCC. The most effective measures to reduce vulnerability—and this is with very high confidence: clean water and sanitation; healthcare, including vaccination and child health services; disaster preparedness and response; and poverty alleviation.

We need to deal with the biggest factors, and I think there's been sort of—we've been missing some of those biggest factors.

So, for example, we often hear about the heat waves in France in 2003, which resulted in many additional deaths. But what people forget to notice is that, in 2006, the French Government, in response to those heat wave deaths, took actions that ended up reducing the estimated death toll by 4,000.

So, this idea that we are helpless to respond to these effects I think is false and creates a sense of helplessness among people that contributes to the rising anxiety and depression.

The World Health Organization and the IPCC both note that there's been a 30-percent decline in the global burden of disease. We should celebrate this. In other words, things are going in the right direction. Life expectancy is continuing to rise around the world. We've seen a 90-percent decline in natural disaster deaths. We have 25-percent global food surpluses.

That doesn't mean that we shouldn't do anything. We should, and we are. But I think we need to do it with some sense of what the trends are.

And this goes for air pollution as well. Between 1980 and 2018, carbon monoxide levels in the U.S. decreased 83 percent; lead levels decreased by 99 percent; nitrogen dioxide, 61 percent; ozone, 31 percent; sulfur dioxide by 91 percent. That's not an argument for not doing anything, but it's an argument for actually taking action in the context of pretty amazing successes and building on them.

As was noted earlier, our carbon emissions have been going down in the United States for the last 13 years. In fact, they've declined

more than they would've declined under the Obama Administration's Clean Power Plan. They declined 34 percent between 2005 and 2019. They would've only declined 32 percent under Obama's Clean Power Plan.

I think we need to be concerned about some of the policies that are being proposed here that could actually make things worse. Anything that makes energy, food, or housing more expensive disproportionately affects the poor and people of color. And we've seen that in California, where our electricity prices went up six times more than they did in the rest of the United States. There's now a civil-rights lawsuit against California's climate policies for that reason.

There's much more to say, but I'll close by saying, I think one of the most urgent things is to prevent the continued closure of nuclear power plants. When that occurs, the evidence is now overwhelming from around the world that deadly air pollution increases. So, if this committee wants to address something right away that really is an emergency, I would encourage this committee to consider what it can do to keep our nuclear power plants operating and even expand them.

Thank you very much, Congresswoman.

Chairwoman MALONEY. Thank you very much.

The chair first recognizes the gentleman from California, Mr. Rouda, for five minutes for questions.

Mr. Rouda?

Mr. ROUDA. Thank you. Thank you, Chairwoman Maloney.

When we talk about climate change, I think it is of utmost importance that we ground ourselves in strong scientific findings. This hearing should not be a time where we debate whether climate change is in fact occurring, where we debate whether climate change is in large part caused by human activity, or where we call someone an alarmist for wanting to immediately act on climate to save lives.

The stakes are simply too high for that, because, as Dr. Shindell has testified here today, millions of American lives are at risk if we in Congress don't stop ignoring the experts and work together in a bipartisan manner to immediately pass major climate legislation.

Where I live, in Orange County, California, Dr. Shindell's research informs us that, if we act now to ensure that we meet the goals under the Paris Agreement by 2040, we would have avoided 21,000 premature air-pollution-related deaths.

Dr. Thakur and Dr. Salas—and hopefully I'm pronouncing that correctly—as practitioners who serve on the front lines of every public health crisis, would you agree that saving this many lives in just one county in the United States is reason alone to act immediately on climate?

Dr. THAKUR. Yes, I would agree with you that acting on climate change now will help save many lives, not just in your county but across the United States and the world.

Dr. SALAS. And I would have to echo that and say that, for me, when I'm standing next to the bedside of a patient, if I can do something to save that one patient's life, then that is enough. So, to talk about numbers of that magnitude is enormously powerful.

Mr. ROUDA. Thank you.

And let's talk about the specific cost of inaction. The reason being is that, although my Republican colleagues have given us many reasons why we should not act on climate change, the one that seems to always come up is that it's too costly.

What we need to understand here today and what we explored in my hearings via our subcommittee is that it's actually the opposite. Inaction on climate change is more costly than if we took action.

So, Dr. Shindell, what does your research find about the economic damage this country will suffer, America will suffer, in just 20 years if we do not take actions consistent with the goals set forth in the Paris accord?

Mr. SHINDELL. Well, what we find are that there are severe costs both for public health—and that's direct medical spending, people going to the hospital, people being admitted to the ER, as well as costs associated with death. There are also severe consequences, billions of dollars lost, due to reduced labor productivity from it simply being too hot to go to work or people having to stay home, as we heard from some of the practitioners, to care for sick children, sick elderly folks.

So, that's not even including things like the cost of increased severity of storms, our climate-intensified weather. We find that these costs to American businesses greatly outweigh the cost of making a clean-energy transition.

Mr. ROUDA. And one of the other aspects of that—and correct me if I'm wrong, but—is how do we quantify the increased healthcare costs associated with climate inaction, as well, correct?

Mr. SHINDELL. That is correct. This is why you sometimes hear the claim that it costs too much to take action, and that's because people are leaving out these somewhat hidden prices, where every business in the country is paying higher health insurance premiums because of all of the health impacts inflicted by burning of fossil fuel. So, if you leave those out, fossil fuel seems cheap. If you actually account for these costs, then renewables are far less expensive than fossil fuels.

Mr. ROUDA. Exactly. Thank you.

And, Dr. Greenstone, your new research takes it a step further; it actually looks at, over the next 100 years, some of the cost of inaction on climate change with extreme heat. Could you briefly describe how your research puts the cost of extreme heat above what was previously done?

Mr. GREENSTONE. Yes. Thank you, Congressman.

So, previously, we had thought that the costs of extreme heat were about $2 per every ton of CO2 emitted into the atmosphere, and our frontline results is that that number was too small by maybe a factor of 18. So, our frontline result is that every ton of CO2 that goes in the atmosphere produces about $37 of mortality damages.

And I think it's cause for—or underscores the urgency of revisiting our estimates of the social cost of carbon and the benefits that we would get from the kinds of policies that would reduce CO2 emissions.

Mr. ROUDA. And when you look at this impact, is it a rural issue, an urban issue, a Democrat issue, a Republican issue? Where does it impact us?

Mr. GREENSTONE. Yes, the heat doesn't care where you live or where you vote—or who you vote for. It is unequal, but it is spread all over the country.

Just in some of the districts of members on this committee, I did a little looking late last night, and there's Republican districts where the damages will be very large; there's also Democratic districts where the damage will be very large.

Mr. ROUDA. And we're seeing, right now, here in California, we are in wildfire season. We have wildfires we're battling right now. We're also dealing with hurricanes and tropical storms on the East Coast. These severe weather events even cause greater economic and health costs.

Does your research pick up those additional costs associated with greater weather events?

Mr. GREENSTONE. Thank you for the great question, Congressman. No, actually, this research is only about the temperature effects of climate change. So, the impacts of stronger hurricanes and wildfires on human health, all of that would be an added to this $37 that I was mentioning.

And, you know, maybe it's just worth highlighting to put—the $37 sounds a little abstract. But the Trump administration has a social cost of carbon inclusive of all costs of climate change—mortality, wildfires, hurricane risks, labor productivity, on and on and on. That's $7. So, what we're finding is just the mortality risks only are five times larger than the Trump administration's estimated benefit of reducing CO2.

Mr. ROUDA. Thank you.

Chairwoman MALONEY. The gentleman's time has expired.

Mr. ROUDA. Thank you, Madam Chair. I yield back.

Chairwoman MALONEY. Thank you.

The chair recognizes Ranking Member Comer for five minutes for questions.

Mr. COMER. Thank you.

Mr. Shellenberger, do you believe in climate change?

Mr. SHELLENBERGER. Well, yes. I mean, of course I think climate change is happening. I think it's being caused by humans. I've dedicated the last 20 years of my life to addressing it.

My concern is with the just gross misrepresentation of what the best available science says that's having these severe mental health impacts.

So, I think it's possible to be somebody that's very concerned and wants to take action on climate change and also pushes back against the extreme alarmism that we've been seeing.

Mr. COMER. Let me ask you this. Do you believe that climate change is the biggest threat to mankind?

Mr. SHELLENBERGER. Absolutely not. I don't know any scientific organization—any serious, credible scientific organization that makes such claims. It's not even our most severe environmental problem.

In fact, I think when you—one of my concerns with what I hear today is people continuing to conflate climate change and air pollu-

tion. They're both serious issues we should address, but it appears like there's some sort of effort to describe climate change as these air pollution problems. They're different. And, in fact, we don't solve problems by combining them. We solve them by breaking them apart and dealing with them separately.

So, yes, in answer to your question, I don't think there's any evidence that climate change is our most serious environmental problem.

Mr. COMER. Well, do you believe that climate change should be described as a crisis or emergency?

Mr. SHELLENBERGER. No. We should be reserving these words, "crisis" and "emergency," for actual crises and emergencies. I think we can all—we're all at home right now because we're in the midst of a coronavirus emergency. And "emergency" and "crisis" suggests a time—an urgent time-delimited factor.

So, we've been dealing with climate change for decades. It's going to be a problem we're going to continue to have to deal with for centuries. That's not to say that we shouldn't take action. We should, and we are. In fact, this idea that somehow, we're not dealing with climate change is just belied by the fact that U.S. emissions have declined 34 percent since 2005.

So, yes, I hope that answers your question. I don't think we should just call everything we that care about a crisis or emergency because we think it will help us politically or something.

Mr. COMER. Right.

Mr. Shellenberger, has any credible scientific body ever claimed that climate change threatens the collapse of civilization or the extinction of the human species?

Mr. SHELLENBERGER. Absolutely not. There is nothing in any of the United Nations Intergovernmental Panel on Climate Change reports suggesting that, nothing in the United Nations Food and Agriculture Organization.

In fact, there's every reason to believe that deaths from natural disasters should continue to go down, that food production should continue to go up, and that the global burden of disease should continue to go down, as it has been for decades and centuries really.

Mr. COMER. So, do you believe that climate change causes, as we've heard from several extremists, diseases similar to COVID–19 to be more frequent and severe?

Mr. SHELLENBERGER. So, the IPCC reviews several diseases. One of the most famous is malaria, but also dengue. And what you find when you review those is the same thing that we find everywhere, which is that there's just bigger factors behind malaria.

We know how to deal with malaria. It's by draining your wetlands or controlling it so you don't have the breeding of mosquitoes, and then you apply—the careful application of insecticides. That also makes the difference for dengue.

IPCC is very clear about this. There's every reason to think that deaths from malaria should continue to go down even as temperatures rise.

Mr. COMER. All right.

My last question, Mr. Shellenberger: Many of the policies contained in the Select Committee on Climate's majority staff report

closely mirror the approach that you've seen in California, both in targets and policies.

It's worth noting that, in the last 10 years, California ranked 44th in carbon emission reductions, according to the EIA, and yet energy costs are significantly higher than the rest of the Nation there in California.

Can you tell us a little bit about your experience in California regarding the impacts of their climate policies on jobs, housing costs, and health?

Mr. SHELLENBERGER. Well, absolutely. As I mentioned, California's electricity rates rose six times more than they did in the rest of the United States since 2011. That's directly because of the incredible expansion of renewables and the infrastructure associated with it.

I would note that my fellow panelist, Michael Greenstone, found that Americans in states with renewable-energy mandates paid $125 billion more in electricity in the seven years after the passage of that. We now have a civil-rights coalition that has sued the state of California because they're saying that our climate policies will make homes between $40,000 and $400,000 more expensive.

And it's just notable to me that California is in the midst of closing down our last nuclear plant, as is New York, Indian Point. And we know now from Japan, from California, the closure of the last nuclear plant, that air pollution rose particularly—and it worsened particularly for poor communities and communities of color.

So, there could be nothing worse, nothing more hypocritical, for people who claim to care about air pollution's impact on health and claim to care about climate change to be actively seeking the closure of America's nuclear power plants.

Mr. COMER. Well, those are great facts and figures. I certainly appreciate you being here. And we certainly don't want to model America's energy policy after California's failed energy policy.

But, Madam Chair, I yield back the balance of my time.

Mr. SHELLENBERGER. Thank you, Congressman.

Mr. SHELLENBERGER. Thank you, Congressman.

Chairwoman MALONEY. Thank you very much.

The chair now recognizes herself for five minutes in questioning.

Dr. Shindell, I would like to ask you about the facts your new research shared with the public this morning urging us to act.

Dr. Shindell, you have found that keeping climate change to 2 degrees C would save 4.5 million American lives over the next 50 years. Is that correct?

Mr. SHINDELL. Yes, that is correct.

Chairwoman MALONEY. How would 4.5 million Americans' lives be saved?

Mr. SHINDELL. The largest method of that would be via cleaner air. And it's the cleaner air that leads to people dying from strokes, from lower respiratory infections, from many causes of disease, diabetes as well. That's not often recognized by the public, but well established by the medical community.

Chairwoman MALONEY. Dr. Shindell, is the world currently on track to keep global warming below 2 degrees C?

Mr. SHINDELL. No.

Chairwoman MALONEY. Do you believe that saving 4.5 million American lives over the next 50 years is a good reason for the Federal Government to act on this issue?

Mr. SHINDELL. Well, to my mind, this is one of the key reasons we have a Federal Government in the first place, is to care for the welfare of the citizens. So, to my mind it would be unconscionable to realize these benefits could be obtained and not attempt to obtain them.

Chairwoman MALONEY. Does your research show that the cost of inaction will be greater than the cost of acting to limit global warming?

Mr. SHINDELL. It shows that the cost of inaction would be far, far greater than the cost of action. We actually come out well ahead by taking action now.

Chairwoman MALONEY. Well, here is one of my deepest concerns. The President has shown us that he and his administration put politics ahead of science. Just take a look at the way they have handled the corona crisis. The President first called the coronavirus a hoax. He has ignored the facts and science. Our constituents are paying for his leadership failure with their lives.

And they're using the same playbook for climate change. The coronavirus pandemic shows us that there are real consequences when our leaders choose to abandon the facts and abandon their responsibility to prepare. We cannot ignore these lessons as we prepare for the harms of climate change.

I now recognize the next Republican, and that person is Congressman Gosar. And now I will let the staff recognize the people that will be testifying as I——

Mr. GOSAR. What's that? Can you hear me?

Chairwoman MALONEY. Yes.

Mr. GOSAR. Can you hear me?

Chairwoman MALONEY. Yes, we can.

Mr. GOSAR. OK.

Good morning. Once again welcome, everybody, to a new day of Groundhog's Day. It's like February all over again. And then we combine that with Chicken Little and the sky is falling. It's incredible that we sit here. We sit here in this committee and talk about the issues of climate change once again. Democrats talk about how we need to shift our energy to strictly renewables, yet they don't want to face the harsh realities that come along with it.

Madam Chairwoman, it is becoming increasingly clear that renewables cannot completely be relied upon for powering our country 100 percent. It's also becoming clear that they cannot be fully relied upon to limit carbon emissions.

The Republican witness, Mr. Shellenberger, authored an article, "Why Renewables Can't Save the World." In this article, Mr. Shellenberger discusses the contrast between France and Germany.

Now, it's interesting. France is almost completely powered by nuclear energy and produces one-tenth, yes, one-tenth of the carbon of Germany, who is a world leader in renewable energy production. This discrepancy can only be explained by France's reliance on nuclear energy and uranium to supply their power grid.

Now, Mr. Shellenberger, could you describe the importance of France's nuclear energy system and its relation to low carbon emissions?

Mr. SHELLENBERGER. Thank you, Congressman.

Yes, I think that to avoid cherry-picking data it's important to look at two big countries over time. And that's what you get with France and Germany, two major countries right next to each other. Over time, Germany is moving away from nuclear. France is 75 percent nuclear, as you mentioned. France spends almost half as much on electricity. That is ten times less carbon intensive than German electricity.

We have seen German electricity prices rise 50 percent as it scaled up renewables over the last 10 years. It is the exact same dynamic in California. There's been many claims that somehow it's different now, that the cost of solar panels is lower, but the big cost associated with renewables is dealing with the unreliability and the large land use requirements.

So, as a conservationist, as somebody who cares about climate change and conservation, it's shocking when you realize that the dilute nature of sunlight and wind is what requires solar, industrial solar and wind farms. They require 300 to 400 times more land than a natural gas plant or a nuclear power plant.

I think it's telling, Congressman, that in your state of Arizona you have the largest nuclear power plant in the United States, it provides huge quantities of clean energy, and yet there was this concerted effort to shut that plant down and replace it with natural gas and solar panels. It's preposterous. It's the same effort that's happening in New York and California.

So, what concerns me is to see so many people that claim to care about climate change that want to demonize people raising concerns about their policies as climate deniers, even as they themselves are seeking to shut down our largest source of zero-emissions energy, often for reasons that I don't think have anything to do with the natural environment.

Mr. GOSAR. You bring up another good point, Mr. Shellenberger. Can you explain the difference between base load and intermittent energy? Because it's an important discussion that people have to understand.

Mr. SHELLENBERGER. Yes. So, any time you're using—solar and wind produce electricity for somewhere between 10 and 40 percent of the time, depending on where you are. Arizona and California are the best. And right now California has to pay Arizona to take our excess solar electricity because we produce too much solar electricity when we don't need it, we don't have demand for it. So, that's another additional cost externalized onto the natural environment.

Solar and wind—solar panels and wind turbines also have no decommissioning costs built into the cost of the plants themselves. The waste goes directly to landfills. Right now, sometimes it's dumped on poor countries. There is no solution to solar panel waste. It has not been cost-effective to recycle. That's why we just end up—solar producers just end up buying raw materials.

So, there's just a variety of ways in which solar and wind in their unreliable nature—and this also something, by the way, that Pro-

fessor Greenstone found in his study, it's the unreliable nature of solar and wind that make it so expensive, so difficult to manage, because you always have to have reliable electricity. That's why—that's how our whole electrical grid system works.

Mr. GOSAR. Yes. So now, I am going to switch gears a little bit. Going back to the importance of critical and rare minerals in the United States, where typically do they come from?

Mr. SHELLENBERGER. Well, this is a huge concern. I mean, the idea that we should become heavily dependent on solar panels imported from China—that's where they come from, we don't produce the vast majority of them here—is a scary prospect.

Also, those are not good jobs, by the way, just installing solar panels. Whereas, at Palo Verde, the nuclear plant in Arizona, other nuclear plants, you can have three generations of people in the same family working at a nuclear plant, because nuclear plants can operate for over 80 years.

We see these wind turbines, solar panels, they start to lose their power output right away. The jobs doing them tend to be low-tech, low-skill, and low-wage jobs, in contrast, I think, to some of the claims that have been made about what those jobs are.

Mr. GOSAR. So, I would like to get down to the brass tacks. To get serious about renewables, we have to seriously look at perpetuating nuclear energy, and as well as looking at our sole supply—supply chain of rare earths and minerals. Would you agree with that?

Mr. SHELLENBERGER. Absolutely.

Chairwoman MALONEY. Congressman, your time has expired, but he may answer your question. OK.

Mr. SHELLENBERGER. Thank you, Congressman.

Yes. I raised the alarm about this last week, and I will raise it again. We're in very serious trouble. China and Russia are building—are in the process of building and selling nuclear plants around the world.

This is our most important and most dangerous dual-use technology that America has always sought to have dominance of, and now we're basically giving it away to the Chinese and Russians. Any country that builds a nuclear power plant is in the sphere of influence of the country that's helping them to build it.

So, again, if you want to talk about a very serious challenge facing American national security as well as our environmental and public health, it's our complete abandonment of nuclear energy and the managed decline of nuclear energy in the United States.

Mr. GOSAR. Thank you, Mr. Shellenberger.

Mr. SHELLENBERGER. Thank you, sir.

Chairwoman MALONEY. Next, Congresswoman Norton is recognized.

Congresswoman Norton.

Ms. NORTON. Madam Chair, I thank you very much for this very important hearing.

When we think of—I have been thinking of climate change in the past, we have been talking about and thinking about what we are actually experiencing, heat waves and floods and extreme weather conditions that are already apparent throughout the world. But

there's been very little focus on human health, and that's why this hearing is so important.

Now, the last six years have been the warmest ever recorded. And last year was, I believe, the warmest. So, I'm not sure what else we need to alert us to do something fast.

Now, we're having heat waves as I speak, Madam Chair, in 50 cities, and among them is the Nation's Capital, where many of you are, and, of course, it is my home district. And I am concerned that climate or heat waves themselves are longer in duration.

So, I have a question about human health to Dr. Salas, because as an emergency room physician, I would like to know whether you're seeing patients develop conditions that have, in your judgment, been worsened by extreme heat. And, if so—or maybe not—what are the most common problems associated with heat, Dr. Salas, do you see?

Dr. SALAS. Well, thank you very much for the question. And you are right, heat is probably our best understood climate exposure pathway or the way in which health is harmed by climate change.

But I often view our current knowledge as an iceberg. So, we see what's on top of the surface of the water, but actually what keeps me up at night is the largest mass underneath.

And I would like to bring up that recently emerging evidence has shown that extreme heat is linked with microbial resistance to antibiotics, to congenital heart disease, to rising incidence of diabetes and mental health issues and rising suicide.

So, this is all early, but I just—you know, heat is sort of that insidious threat multiplier that I think worsens existing diseases. It causes heat emergencies, like I talked about in my opening testimony. And I think there's a whole suite of ways in which it harms health and makes it harder for me to do my job, because we know that heat is also increasing the risk of power outages at hospitals.

Ms. NORTON. When you point out some of the diseases that are affected by climate change, you are, I think, opening up a whole series of—a whole set of research that we need to do. Climate change on specific conditions, very important testimony.

I want to go next to Dr. Thakur, because I am particularly concerned about asthma. We know about the increase in asthma.

And I want to ask a question, Dr. Thakur, about the seven percent of adults and eight percent of children in the United States that have asthma. I wonder whether extreme heat can be dangerous to people with asthma, and if so, why would that be the case?

Dr. THAKUR. So, during extreme heat events it causes breathing to worsen. So, for those individuals that have asthma, they become short of breath and they can have a risk for exacerbation of asthma attacks.

I also think it's important to remember that heat also causes ozone production to be increased at the ground surface, and ozone itself is an important pollutant that contributes to the development of asthma. So, not only is heat in its moment exacerbating asthma among those

[inaudible] that have it, it also can be leading to

[inaudible] asthma and

[inaudible] conditions in low-income communities.

Ms. NORTON. Dr. Thakur, if global temperatures continue to rise, is it safe to assume that heat-related illnesses and deaths will also continue to rise? That's a question for you, Dr. Thakur, and Dr. Salas.

Dr. THAKUR. Yes. I think if we see heat continuing to rise and continue to experience the extreme heat events that we've been having for the past five years, we will continue to see increased mortality and deaths related and morbidity related to heat waves.

Ms. NORTON. And Dr. Salas?

Dr. SALAS. Yes, I agree. So, as an emergency medicine doctor, I am trained to identify emergencies, and the rising heat exposure is an emergency.

Ms. NORTON. I thank you both.

And again, Madam Chair, I thank you for this very important hearing, and yield back.

Chairwoman MALONEY. Thank you very much.

Representative Massie, you are now recognized for five minutes.

Mr. MASSIE. Thank you, Madam Chairman.

Dr. Greenstone, I really appreciate that you provided the data that came out of your study and pointed out that regionally it varies, that there's just not one answer nationwide.

I was interested, particularly, in the climate-induced mortality risk impact of an increase in temperature. And you explained why actually people could live longer in Cook County, Illinois, and that's what your data shows, if the temperature goes up. Of course, your data shows that they would live possibly a shorter life if they were somewhere else in the United States.

But can you explain why Florida could see a decrease in climate-induced mortality risk when the temperature goes up? That was an interesting finding in your data.

Mr. GREENSTONE. Thank you for the question, Congressman. It's an important question.

There are some—the Florida results are largely, we think, because they have already done all the adaptations they could do, and their population is projected to continue to age, and so you'll have people who—more and more people who are susceptible to stress since there will be more—this will lead to a reduction in mortality input (inaudible).

Mr. MASSIE. They could live longer in Florida if the temperature—or if the climate——

Mr. GREENSTONE. I am sorry. I am sorry. I misspoke. Let me try again.

The demographics of the people in Florida are projected to change. What does that mean in particular? That means that the population is projected to get younger. That the—and most of the heat-related mortality comes from the elderly. So, as the population gets younger, that will naturally lead to lower mortality rates.

Mr. MASSIE. OK. Thank you very much.

Let's see. Dr. Shindell, you mentioned that it's your opinion that if people reduced consumption of cattle-based foods that that would reduce methane emissions.

Do you believe that methane production from ruminating animals is higher today than it was before Europeans settled North America?

Mr. SHINDELL. Different animal species emit different amounts of methane, and cows are particularly large. So, it's not something that I believe, it is data from the World Health Organization which shows that in North America, on average, adults eat around six times more beef and dairy products from cows than is recommended for their own health.

Mr. MASSIE. Right. Yes.

Mr. SHINDELL. So, reducing that would improve our health and reduce methane.

Mr. MASSIE. That wasn't my question. My question is, is there more methane produced by animals, ruminating animals in North America, than there was before we industrialized it and before we colonized it?

Mr. SHINDELL. Yes, that is also true.

Mr. MASSIE. How many buffalo or bison were there in North America before Europeans settled it?

Mr. SHINDELL. Those are less intense, and that's what I was trying to get at in my original answer, is that cows emit more per head than sheep or goats or bison or other ruminant animals.

Mr. MASSIE. Does a cow that eats corn produce more methane or less methane than one that eats grass?

Mr. SHINDELL. It is not a very large difference.

Mr. MASSIE. That wasn't my question. Which produces more?

Mr. SHINDELL. I'm not positive of that. To my mind, they are about the same.

Mr. MASSIE. Then how can you make a statement that cattle, domestic cattle, produce more methane than the buffalo did before we got here? Because that statement is false.

Mr. SHINDELL. No, because buffalo are not the same animals as cows. Those are different species, and that's what I was getting at. Different species emit different amounts of methane per head.

Mr. MASSIE. Yes, but you have no idea. You're just guessing. You don't even know the answer.

Mr. SHINDELL. No, we have solid data on that. I said I do not know the amount of methane based on the diet of the animal, but the amount of methane per species.

Mr. MASSIE. So, how many buffalo were there? How many buffalo were here or bison?

Mr. SHINDELL. I can't tell you the exact number, but we have observations of methane.

Mr. MASSIE. If you don't know the number, how could you know if our methane production has gone up or down?

A quick question for Dr. Thakur. My time is expiring.

Dr. Thakur, I'm glad you pointed out that CO2 is plant food and that growing seasons are extended when CO2 goes up in the environment. Is that what you said?

Dr. THAKUR. I said that CO2 production causes pollen, increased pollen production, and does prolong the growing season. And the increased pollen production exacerbates hay fever or allergic diseases such as asthma.

Mr. MASSIE. And you said that it extended it in Minnesota and North Dakota, which produce—they're No. 1 producers of green peas, sweat corn, honey, oats, wheat, red kidney beans. How much more of that can be produced when the CO2 goes up?

Chairwoman MALONEY. Your time has expired, but she may answer your question.

Dr. THAKUR. I cannot comment on the production of vegetables or products, agricultural products. But what I can comment on is that CO2 increases the production of pollen of plants that are causing allergy diseases, including for my son and for my patients that causes them to have prolonged asthma exacerbations during the pollen seasons.

Chairwoman MALONEY. OK. Your time has expired. Thank you.

Mr. MASSIE. Thank you, Madam Chairman.

Chairwoman MALONEY. Congressman Lynch, you are recognized.

Mr. LYNCH. Hello. Can you hear me?

Chairwoman MALONEY. Yes, we can.

Mr. LYNCH. OK. Thank you, Madam Chair. Thanks for holding this hearing. Thank you to the ranking member and to all of our witnesses as well.

I do want to take a second just to push back a little bit on Mr. Gosar's suggestion that there's been inaction on this committee. I do want to thank all the members. I had 44 cosponsors, Democrats and Republicans, that helped me on my bill in the NDAA, the National Defense Authorization Act.

My bill was the Climate Change National Security Strategy Act, which will require, as most members know, all 13 Federal agencies to budget for climate change response and resiliency. So, we figured, back of the envelope, it will provide billions of dollars over the next 10 years toward climate change response and resiliency.

My other bill, which had a lot of sponsors as well on this committee, both Democrats and Republicans, was the Green Buses for Every City Act, which brought a 500 percent increase on the amount of money we spend on green technology in our bus fleet. These are zero-emission buses. We put in $1.7 billion into that program, a 500 percent increase.

And my amendment, in particular, targeted those zero-emission buses to low-income and communities of color that have seen disparate health impacts as climate change has exacerbated.

There was a troubling study—and I want to address this question to Dr. Thakur and Dr. Salas, because you're working on this—there was a study out of the Environmental Inequality Lab at UVA, University of Virginia, that indicated that while air pollution has dropped 71 percent since 1980, it hasn't dropped in those areas, low-income, mostly communities of color. So, I'm trying to get at that in some legislation.

One of the things that really bothers me is that—so in my district, the FAA has gone to this concentrated flight path, this NextGen system. So, I have thousands and thousands of flights that fly over minority communities and low-income communities, because the rents are lower because the planes are so loud.

How do we get at things like that in terms of a wider national approach, but also getting at those low-income and minority neighborhoods that are seeing this disparate impact because of air pollution effects?

Dr. Thakur?

Dr. THAKUR. Yes. So, thank you for your question. This is such an important disparity that you highlighted. And, in fact, the stud-

ies show that low-income communities of color experience 37 percent higher nitrogen dioxide exposure, which is a really important traffic-related air pollutant that my own work has shown to be contributing to the development of asthma and worse pulmonary function, particularly in low-income communities of color.

And what we need to be thinking about going forward is not only putting clean buses on the roads, but also thinking about other large vehicles that are on the road that are producing diesel and other toxic air pollutants. So, addressing policies toward that.

In fact, in another study that we're working on we show that low-income communities, that the traffic patterns that go through those communities happen to be those large truck vehicles.

So, you are right. While overall air quality in the United States has improved, it has not changed for those communities.

Mr. LYNCH. Thank you.

Dr. Salas, my homie, could you respond to the same question?

Dr. SALAS. Yes, of course. And I think for me in the emergency department, so oftentimes a patient may have a lot of different symptoms, or I may see a lot of different findings. But I really try to get back to what the root cause is, because oftentimes it's one thing that's affecting a lot of different organs.

I think that this relationship between climate change and air pollution is exactly the same in the sense that I go back to what the root cause is. The combustion and burning of fossil fuels is largely driving climate change, in addition to other factors, but is also creating air pollution.

By getting to that root cause we can actually help treat both problems, and we get the immediate health benefits of reducing air pollution, and especially for minority communities like you pointed out.

Mr. LYNCH. Thank you, Madam Chair. I yield back. My time has expired. Thank you.

Chairwoman MALONEY. Representative Hice, you are now recognized for five minutes. Representative Hice.

Mr. HICE. Thank you, Madam Chair.

You know, I just want to bring this up. There have been several comments from—misleading comments, quite frankly—from our colleagues on the other side that implied that somehow the floods that we're seeing, the increased intensity of storms, or whatever, is somehow due to the climate change, when in fact the International Panel on Climate Change and the National Climate Assessment reports have both stated clearly that there's no evidence for that.

So, I believe there's just a lot of fearmongering here going on with that for which there is no evidence to support.

And, Mr. Shellenberger, I want to thank you for being here today as well. I did read the letter that you wrote to Speaker Pelosi regarding the experience you had with the Select Committee on the Climate Crisis last week. It's unfortunate that you experienced what you did there.

But we are tending to see more of this new definition of tolerance, which means that you must agree with certain Members on the other side, and if you don't, there is attack and aggression,

which I think is unfortunate. But I am grateful for your witness here today and for your presence here with us.

I want to speak really quickly about the Green New Deal. You seem to be following this quite a bit and very much aware of it. There are currently a hundred Democrat cosponsors, zero Republicans.

But what amazes me is some of the information that's in here, some of the accusations, some of the things that are in here. For example, claiming that the United States has a disproportionate amount of greenhouse gas emissions, when in fact, as you stated earlier, the U.S. CO2 emissions are declining, while we are watching emissions in other countries, China and India, for example, continue to increase.

We also see in the Green New Deal a call for net-zero greenhouse gas emissions through a 10-year mobilization period, and at the same time meeting 100 percent of the country's power demands through clean renewable and zero-emission energy sources. It's just amazing to me.

The Green New Deal also offers high quality union jobs. It tries to guarantee a job with a family sustaining wage and adequate family and medical leave, paid vacations, and retirement security to everyone in the country.

These things don't have anything to do with climate.

It also declares that we must provide healthcare for everyone in the country.

According to a since deleted fact sheet that was circulated by a congressional office, the Green New Deal is, quote, "a massive transformation of our society."

That's really what it is. That's what the Green New Deal is really all about. It's not ultimately about climate change. In fact, it even would provide economic security for all who are unable or unwilling to work. Amazing.

The Green New Deal also implies the need to end air travel. In fact, the chief of staff of a Democrat behind this bill stated, quote, "The interesting thing about the Green New Deal is it wasn't originally a climate change thing at all, because we really think of it as a 'how do you change the entire economy' thing."

So, with all of that—and there's tons of information out, we would see a GDP loss of over 15 trillion, so many stats here. But, Mr. Shellenberger, I just want to know, have you done research into the cost and benefits of the Green New Deal?

Mr. SHELLENBERGER. Well, thank you Congressman, and I appreciate your remarks earlier, and I appreciate the bipartisanship. As you know, I am a lifelong Democrat, and I support many of the aspects of other parts of the Democratic agenda. I am just raising these concerns here, and I appreciate your reaching across the aisle to let me speak.

I wanted to also say that I just think this discourse which sort of suggests there's been no progress on reducing pollution or reducing carbon emissions, it's totally misleading, it's fearmongering.

And furthermore, what's most disturbing to me is that the implicit argument of things getting worse, what people are actually saying is that "all else being equal." Yes, all else being equal, it would be better if temperatures just didn't change at all because

we have created this whole civilization around this temperature. So, all else being equal, yes, it would be better.

But we have every reason to believe that deaths from natural disasters, food surpluses, and disease will continue to go down in the future. There's no reason that that should not occur.

So, yes, I agree with you, if you want to solve pollution problems we should do it the way we have always done it, which is making our ways of making electricity cleaner—mostly, by the way, it's through natural gas and nuclear, not through renewables.

And, yes, I think you are right to object. I mean, I personally would favor more of a Canadian healthcare system. You and I probably disagree about that. But I don't think climate legislation is the right place to implement healthcare, for example. You do it by breaking them apart.

Chairwoman MALONEY. Your time has expired.

But you may continue to answer the question.

I now recognize Mr. Connolly. Congressman Connolly.

Mr. CONNOLLY. Yes, Madam Chairman, before I begin, before I begin, could I correct the record? Dr. Greenstone, in talking about the national capital region, said there were two members on the committee from the national capital region. There are three. All of the district that I represent is fully within the national capital region. So, there are three of us, not two.

But your data is very helpful. Thank you, Dr. Greenstone.

Thank you, Madam Chairman.

Dr. Shindell, we have been listening to Mr. Shellenberger, and he says we shouldn't cherry-pick data. So, some of the data that I thought was striking about global warming he has not cited. So, let's not just cherry-pick, let's make a full picture.

What's happening to CO2 and methane levels and are they contributing to global warming? And are they at historic levels or are they something we just need to live with?

Mr. SHINDELL. Thank you, Congressman. That's a great question. And I like the way you asked what's happening rather than what I believe.

These are measurements that government researchers and academics have made around the world. And carbon dioxide levels have now risen to levels we haven't seen in hundreds of thousands of years. Methane levels have more than doubled. And we have measured from space via satellite how they have increased the greenhouse effect over time. So, this is all data.

Mr. CONNOLLY. And that CO2 level rise, let's be very clear, because, again, Mr. Shellenberger cited the IPCC. Those CO2 levels, which are at historic highs over hundreds of thousands of years, that's just a normal geological cycle we have got to adjust to? Or is that actually caused because of human dynamics?

Mr. SHINDELL. It is unequivocally caused by human dynamics. And that's the case for methane as well. We have chemical fingerprints. We have abundant data demonstrating that.

Mr. CONNOLLY. So, just citing those two, we can cite others, what are the consequences of higher CO2 levels and higher methane levels that are apparently caused by human interaction, they're not part of the normal geological cycle? But so what? Can we just live with it? I mean, after all, Mr. Shellenberger talks about disease

rates are improving, longevity is improving, we can adjust, all is not bad.

Mr. SHINDELL. Well, there is some truth to that in that everything is not bad, and our civilization on this planet has made a lot of progress. But that doesn't mean future progress is guaranteed.

And we have ample evidence from periods in the past when greenhouse gas levels have been high that there are severe consequences, things like meters and meters of rise of sea level. And, of course, we're seeing now record-breaking heat leading to an increase in the severest storms, the most intense storms that strike our coasts, in heat waves, and in floods and droughts at the same time.

Mr. CONNOLLY. So, in terms of a practical consequence, you mentioned sea level rise. What's causing sea level rise?

Mr. SHINDELL. That's caused by the increased trapping of heat by greenhouse gases due to human activity, specifically CO2 and methane.

Mr. CONNOLLY. In other words, the melting of ice sheets?

Mr. SHINDELL. It's both the melting of ice sheets, yes, and the expansion of the water itself.

Mr. CONNOLLY. And what's the projection based on the IPCC Mr. Shellenberger cites, what's the projection of sea level rise if we don't get this under control?

Mr. SHINDELL. Well, sea level rise is—the good and bad news is the same in that it's very slow. So, if we do not get this under control, sea level rise could be approaching several feet by the end of the century, but could be many, many tens of feet, meaning the loss of almost all states, within the next couple centuries.

Mr. CONNOLLY. Well, aren't there some parts of America, for example, may be more susceptible to sea level rise, combined with subsidence of land, that could significantly affect populations like Miami, like coastal Louisiana?

Mr. SHINDELL. Definitely. And, in fact, a huge fraction of our population lives in harm's way because they live on the coast, even Los Angeles and western cities. But you're right, the Southeast is the most susceptible.

Mr. CONNOLLY. So, the charge has been made by Mr. Shellenberger and some of my friends on the other side of the aisle that people like you are extreme alarmists and you are engaged in fearmongering. I want to give you the opportunity to respond to that.

Mr. SHINDELL. Well, as was mentioned in my introduction, I have worked on the Intergovernmental Panel on Climate Change reports, and I think that they have been, if anything, quite conservative. They are consensus documents where we get scientists from all over the world to agree on what we know with the most certainty.

Looking back at these documents and comparing what's actually happened with what we have projected to be likely over the past 20 years or so, we find that more than 10 to 1 we underpredicted the severity of consequences that we discussed.

I would say that there's no such thing as fearmongering or alarmism within the scientific community. There is some of that in the media, potentially. But it is inaccurate to level that kind of

charge. The data do not support that charge when comparing past predictions against what actually happened.

Mr. CONNOLLY. Thank you. I yield back.

Chairwoman MALONEY. Thank you so much.

Mr. SHELLENBERGER. Chairwoman, may I respond since the Congressman actually repeatedly suggested I said things?

First of all, I did not accuse Professor Shindell of alarmism or extremism.

In terms of the question from the Congressman, the IPCC predicts median sea level rise will be 2.2 feet by 2100, just to get the actual number out there.

And in terms of alarmism somehow not coming at all from the scientific community, I interviewed the lead author of the IPCC report on sea level rise, and he told me he was quoted saying that sea level rise would be, quote/unquote, "unmanageable" and gave the impression that it would be apocalyptic. But when I interviewed him, he was pointing to things like Hurricane Katrina and Hurricane Sandy where the flood management systems failed.

So, this other idea I think the Congressman is suggesting, that I'm suggesting that we don't do anything, I'm advocating that we do things, we continue to do what we have been doing, which is both to reduce emissions and to become more prepared.

So, I just want to make sure my views are fairly represented.

Mr. CONNOLLY. Madam Chairwoman, just I did not mean in any way to distort what Mr. Shellenberger said. I was trying to give Dr. Shindell an opportunity to respond to the things Mr. Shellenberger had said. I didn't try to characterize him; I tried to take his own words and ask Dr. Shindell as a matter of testimony to respond. Thank you.

Chairwoman MALONEY. OK. Thank you. We're going to be following regular order now.

Congressman Grothman, you are now recognized.

Mr. GROTHMAN. Can you hear me?

Chairwoman MALONEY. We can hear you.

Mr. GROTHMAN. Oh, good. Wonderful, wonderful, wonderful.

OK. I'd like talk to the doctor again a little bit more here with regard to nuclear energy. Obviously, I am old enough to remember when they made it just a horrible thing and all but shut it down. We still have a nuclear power plant in my district. One right outside of my district had to be closed.

I'm wondering if you could comment on the amount of pollutants in the air today, because of we have replaced all these nuclear power plants, how much pollution we have because of it if we hadn't decided to shut off the nuclear energy, and the motivation you think of the people who 30 years ago did movies, that sort of thing, to kind of end that line of providing energy.

Mr. Shellenberger?

Mr. SHELLENBERGER. Thank you, Congressman, for that question. And by the way, that nuclear plant in Wisconsin did not need to be closed down.

Nuclear plants can be—American nuclear plants, not all nuclear plants, can be refurbished, and, in fact, they regularly are, to run for 80 years or longer. You might have to replace turbines. At some point you might have replace the reactor core.

But these 60 or so sites around the United States, for anybody who cares about climate change, should be the basis for deep decarbonization because you can simply expand the number of reactors on a given site. Also, my view is that the used fuel is best stored onsite.

In terms of how much pollution was created by the effort to shut down nuclear, well, you may recall that in the 1950's, 1960's, and even early 1970's there were people that wanted to have 50 percent of our electricity from nuclear. Today we get just 20 percent.

Every time a single nuclear reactor shuts down it's the equivalent of putting about a million new cars on the road. So, you if you get rid of our roughly a hundred nuclear reactors in the United States, it's like adding a hundred million cars on the road in terms of CO2 emissions, by the way.

I mentioned a study in Nature Energy in 2017 that found that closing nuclear plants reduced birth weight significantly. So, I am sort of surprised to hear that people on this—the witnesses here talking about being concerned about communities of color and poor communities and not mentioning it at all that the closure of nuclear plants has directly affected low birth weight. And that was a peer-reviewed study in Nature Energy.

We similarly saw in both Fukushima now and in—I'm sorry, Japan and Germany after the Fukushima accident, the closure of nuclear plants resulted in greater air pollution, alongside higher electricity costs.

The motivations, I'm afraid, are not—have not been positive motivations. There's a generalized fear of nuclear energy associated with fear of nuclear weapons. But it was manipulated, starting in the 1960's, and I described this in great detail in my book and elsewhere, by the Sierra Club. And it came from this idea that nuclear energy was bad because it allowed for abundant energy, that energy basically eliminates scarcity.

With nuclear energy there is no climate crisis. If we simply had scaled up nuclear energy in the 1950's and 1960's, as many of us imagined we would, we wouldn't be having this conversation today. If every country had done what France had done, we wouldn't be having this conversation today.

With nuclear, with abundant infinite energy effectively, you get infinite fresh water, infinite fertilizer, and infinite food. And the people that opposed it, both here in my home state of California and around the world, explicitly said that we should not have cheap and abundant energy because of what humans would do with it.

So, at the end of my testimony you may note that I have a passage where I note that environmental policy has been influenced enormously by some very reactionary ideas, I think, that are very anti-human ideas, that suggest that humans are a cancer on the Earth and that we need to stop the spread of that cancer by reducing the amount of—by making—basically by making food and energy, and including housing, more expensive. And I think that this is totally wrong.

We know that with abundant clean energy we can also concentrate agriculture, leaving more of the Earth for other species. We can significantly reduce air pollution.

There's a very—there's a lot of good news, there's a lot of—there's a very positive future. This idea that we need to go terrify school children in order to reduce air pollution, or the claims that somehow these reductions in air pollution occurred because we scared people or we engaged in this kind of alarmism, is just false. We did so because we actually believed in progress.

So, that's the heart of the move against nuclear, and I see it in this climate discourse. It's inaccurate, it's exaggerated, and in many cases I think it's quite extreme. And a positive, pro-nuclear future, I think, points to ways in which we can achieve both human flourishing and environmental progress.

Mr. GROTHMAN. What do you think other countries like China and Russia think of our—?

Mr. SHELLENBERGER. Well, they're delighted. I mean, I would note that after Greta—the student activist Greta Thunberg suggested that economic growth was the problem, it was Vladimir Putin who stuck up for poor and developing countries and their right to develop.

I mean, what is so disturbing to me is that so often these Malthusian efforts have sought to make energy and food scarcer and more expensive for poor and developing countries. Even if you don't care about people in those countries, that's a terrible strategy for American national security. We should be seeking to make friends and allies abroad, not seeking to make their energy and food supplies—not seeking to restrict their energy and food supplies.

Mr. GROTHMAN. Somebody told me I should ask you if you have heard of the word "baizuo"? It's a Chinese word, b-a-i-z-u-o.

Mr. SHELLENBERGER. I have, though I can't remember what it means now.

Mr. GROTHMAN. Why don't you look it up?

Mr. SHELLENBERGER. OK.

Mr. GROTHMAN. B-a-i-z-u-o. You'll like it.

Mr. SHELLENBERGER. OK. Thank you.

Mr. GROTHMAN. Thanks so much for giving me so much time, Madam Chairman.

Chairwoman MALONEY. Thank you. Thank you so much. And Dr. Greenstone has indicated he would like to also respond.

Dr. Greenstone?

Mr. GREENSTONE. Thank you, Chairwoman.

Look, I wanted to—I think Mr. Shellenberger's testimony has raised a series of important issues, and I thought it maybe would be worth trying to tackle them.

Unfortunately, what I feel like has been going on in his testimony is the raising up of several bogeymen, which are really kind of giant distractions.

The first is some side debate about whether or not climate change is existential. Let's just all agree humanity is not going to end tomorrow.

Then there's this kind of very confusing set of arguments that he's making about renewables, that people say that that's the only way to confront climate change. I don't think you can say that. That solar panels are made by the Chinese, that they're Chinese- and Russia-built nuclear plants. None of that has really anything to do or is tangentially related to climate change.

The third kind of bogeyman that he's raising, that he continues to raise, and I think is very distracting from the issue at hand is that climate change is undermining our mental health, so we should stop talking about it. I guess that's the implication.

And then there's several more, but I guess another kind of bogeyman or distraction is that the world is getting richer and prospering and all kinds of other indicators are improving. That's all to be applauded. And, obviously, the implication that he wants us to take away from that is we should look the other way from climate change because that's not really relevant.

So, I guess what I wanted to highlight that I find very troubling in his discussion is his raising the bogeymen distracts from what I see as the core issue of, I presume, why you convened this hearing, which is, one, climate change has very, very substantial costs. The paper that I released this week with my colleagues suggests that—I think alters fundamentally our understanding of the temperature risks for mortality. They suggest they are at least an order of magnitude larger than we had previously understood. That's just a fact.

No. 2, the benefits of mitigation only in this small area of mortality risk, or one area, I don't want to say small, are $37 for every count. So, every time we can pull out of the atmosphere (inaudible), that's $37 of benefits.

Then the last point I want to make is creating this false narrative of renewables versus nuclear. It's a strange way to approach the problem, I think, especially when the United States has had such a successful history in other energy and pollution areas of just leveling the playing field between energy sources.

So, rather than having a committee or Mr. Shellenberger pick winners or losers, there's a very clear case for allowing all energy sources to compete equally, and that would certainly include penalizing the sources that are the cause of the climate damages that are real.

So, I just wanted to add that. Thank you for the time.

Mr. SHELLENBERGER. Chairwoman, may I please respond to Professor Greenstone?

Chairwoman MALONEY. Can we continue with the members, and then at the end, you and Mr. Greenstone can discuss it back and forth as much as possible? The members are on—they have other meetings; we have a time slot for them.

So, if we could let our members get through their questions, and at the end you and others can talk as much as you want. But I think we have to follow regular order. You will have as much time as you want after the members who have designated time slots. They have other meetings, other conflicts. So, I would like to get back to regular order.

Congress Member Raskin, you are now recognized for your five minutes.

Mr. RASKIN. Madam Chair, thank you very much.

I remember when critics of the climate change consensus in the scientific community used to deny the existence and reality of climate change. And I suppose it is big progress that they seem to have surrendered that position. I don't hear anybody anymore de-

nying the existence of climate change, at least in an official setting like this, and I do think that that's progress.

But the question now seems to have turned to, as Dr. Greenstone just said, either side issues, which I think are an irrelevant distraction from what we're focused on, or else basically emotional or psychological question of how alarmed we should be. And I suppose we can talk about that. But I would rather be focused on the actual scientific evidence we have of the processes that are underway.

So, Dr. Shindell, I would like to ask you, is climate change getting worse? In other words, if we stay on the course we're on, are we headed for more and more of the kinds of disasters we have seen in terms of record drought and record forest fires and rising ocean levels and so on?

Mr. SHINDELL. Yes, that is unequivocal from the evidence and the combination of theory and models, that not only are what we are seeing now likely to continue, but to worsen, and we will see additional effects like them. So, increase in the strongest hurricanes, more heat waves, droughts, fires, floods, et cetera.

Mr. RASKIN. But there seems—sometimes there's an effort, and I think we have seen it today, to detach actual events we're seeing, whether it's increasing extreme weather events, like hurricanes, or record droughts, record heat waves, and rising ocean levels, there's an effort to detach the things we actually see around us from the process of climate change.

Is it, in fact, illegitimate for people to take notice of what's going on around us and to link that to the larger process underway?

Mr. SHINDELL. Well, that's a great question, thank you. And I would say the answer is, unfortunately, it is not illegitimate, but it used to be. A lot of the misunderstanding, I think, comes from decades ago. The effects were not large enough to distinguish from natural variability. And now our science has advanced, and the effects are larger.

So, not every single case, but many, many cases of extreme weather and climate-related disasters can be attributed to human activity.

Mr. RASKIN. OK. So, there's nothing at all irrational or illogical about people noticing these events and linking it to climate change?

Mr. SHINDELL. No. I would say, in fact, it would be illogical not to take into account what we're seeing around us.

Mr. RASKIN. OK.

I want to ask about air pollution. Let's assume that climate change were not occurring. Let's say, just take it off the table. Is air pollution getting worse in America or is it getting better?

Mr. SHINDELL. No, air pollution has over the long-term been on a downward trend, but slow.

Mr. RASKIN. OK. But there are still serious health effects from air pollution as some of the doctors were suggesting, right?

Mr. SHINDELL. That is unequivocal. We find around a quarter million Americans are dying early every year due to air pollution.

Mr. RASKIN. OK. Despite our best efforts and despite the progress that we have made so far. And of course, this administration is doing everything it can to undo a lot of the progress by reversing dozens of air pollution regulations that we have put in place at the EPA.

Is there something illogical or strange about trying to make progress on climate change with the same solutions we're using to try to reduce air pollution?

Mr. SHINDELL. Well, no. And, in fact, I think what we need to recognize is that the progress we have made in air pollution did not come about just by chance because time went on, but by a lot of hard work by the EPA putting into place effective regulations.

And what their analysis shows now is that it's actually less expensive to deal with air pollution and climate change as a unified problem, that we do not want to separate these. We find the most cost-effective solutions by tackling these simultaneously.

Mr. RASKIN. OK. You know, we live in an age of a lot of disinformation and propaganda and mythology. I mean, you think about COVID–19, this terrible disease which has now afflicted more than 4 million Americans and killed 156,000 Americans. Still, we have heard and been invited to believe by high government sources that children are basically immune to the disease, which they're not, that COVID–19 is a hoax, which obviously it's not, that it can be cured with hydroxychloroquine when the medical authorities and the FDA say that that's not true, and that ingesting disinfectant can be a cure to the disease, which it definitely isn't.

What about the propaganda and disinformation about climate change, has that been a hindrance to our ability to address the problem in a bipartisan or multipartisan or nonpartisan way?

Chairwoman MALONEY. The gentleman's time has expired.

You may answer his question.

Mr. SHINDELL. Thank you, Chairwoman.

I would say that, yes, that has been a distraction, that it has made it harder to achieve progress, it has made it harder to put the actual cost of using fossil fuels into our economic system, what my colleague Dr. Greenstone has been discussing, the social cost, namely that we should level the playing field and we should account for the real cost of burning fossil fuels that cause both climate change and air pollution, and then we can let the market decide.

It's already shifting in the direction we want, but it would be shifting faster without the misinformation and the failure to account for the real cost of using fossil fuels.

Mr. RASKIN. Thank you.

Chairwoman MALONEY. Thank you. The gentleman's time has expired.

Congress Member Palmer, you are now recognized for five minutes. Congress Member Palmer?

Mr. PALMER. Thank you, Madam Chairman.

First of all, for the record, I agree that the climate is changing, and I believe human activity contributes to it, but that is not the leading factor for climate change.

I asked three scientists who appeared before the Select Committee on the Climate Crisis, including one scientist who is the lead author and lead editor of the International Panel on Climate Change report, if we completely eliminated all CO2 emissions, went to absolute zero in the United States, would it stop climate change? And their unanimous answer was no.

I asked, if we completely eliminated all CO2 emissions worldwide, went to absolute zero, would it stop climate change? And their unanimous answer is no.

That does not mean that we shouldn't do all that we can to mitigate and reduce CO2 emissions. But I think that Dr. Shellenberger is right on point in that the way to do that is to utilize the technology that we have, particularly in nuclear energy and natural gas, but also be constantly developing new technologies, such as what we're seeing coming out of MIT in terms of capturing carbon from the air and converting it for other uses, and methane. And we can actually do more to reduce climate—the temperature in the short-term by capturing methane than we can carbon, CO2.

So, with that said, I want to address some of these issues about health. Everybody here seems to be totally focused on human health.

Dr. Shindell, I think you may have been part of a Duke University report that said that heat is the leading weather-related killer. Is that correct?

Mr. SHINDELL. That is correct.

Mr. PALMER. Well, that's interesting, because a subsequent publication or another publication from The Lancet said that cold weather, even moderate cold, kills 20 times more people than heat. Which I don't know where you got your information that is that cold—even the CDC says that cold is a greater threat to human life than heat, even moderate cold. So, I just wanted to point that out.

And for Dr. Salas, you made a statement to Time magazine, you said, "With every degree of warming, we are committing a child born today to a future where their health and well-being will be increasingly threatened." Were you talking about American children, or was that a global statement?

Dr. SALAS. So, that was based off the 2019 Lancet Countdown report. It is published in The Lancet, which is one of the world's most prestigious medical journals. And it was——

Mr. PALMER. I just asked a simple "yes" or "no."

Dr. SALAS. Well, it was making a global statement, which applies to——

Mr. PALMER. OK. Thank you.

Dr. SALAS. We're part of the globe.

Mr. PALMER. All right.

Dr. SALAS. Yes.

Mr. PALMER. Yep. Well, thank you. That's what I wanted to know.

Because I also want to know if you believe that it's in our best interests to reduce economic activity in order to reduce pollution. Because you guys keep conflating air quality with climate change. Those are two separate things.

But do agree that we need to reduce economic activity to reduce the amount of pollution and also to impact climate change to improve human health? That's a "yes" or "no."

Dr. SALAS. Well, I would like to say that it's interesting, in regard to the discussion around pollution, because, yes, there have been——

Mr. PALMER. No, no. I——

Dr. SALAS [continuing]. changes to pollution——

Mr. PALMER. I'm just asking a simple question. Do you agree that we're better off reducing economic activity to protect human health, in regard to reducing pollution?

Dr. SALAS. I don't think——

Mr. PALMER. Is that——

Dr. SALAS. It's not an either/or question.

Mr. PALMER. Well, apparently it is, because that's what Greta Thunberg was advocating. It's also what a report from the National Center for Biotechnology Information was advocating, literally, that "evidence supports the overall hypothesis that a strong economy is associated with elevated air pollution levels and, in particular, mobile-source pollutants. Similarly, a weak economy is associated with lower air pollution levels" and supposedly improved human health.

So, I just think that we go off the rails when we get on these topics, and it's political. I mean, this statement that people were advocating hydroxychloroquine as a cure is a misrepresentation. Hydroxychloroquine was offered as a therapeutic to help people recover more quickly. It doesn't cure any—it doesn't cure COVID–19.

So, it just drives me nuts that I listen to people like you come before the committee and it's all political, it's all an agenda, when there are ways to improve the human condition.

If we implement what is being proposed through the Green New Deal, we're talking about adding 78 million more people who will go hungry. That's worldwide, that's global. We're talking about denying people access to basic necessities that we take for granted in this country, like being able to have a refrigerator. And we think that we can meet those needs with renewables that, with what we could provide right now, would probably power a big-screen TV for half a day.

I mean, Dr. Shellenberger, if you would like to comment on that, I've got a little bit of time left.

Madam Chairman, I can't see the timer.

Dr. Shellenberger?

Chairwoman MALONEY. It's expired. Your time has expired. She may answer your question.

Mr. PALMER. Well, it was directed to Dr. Shellenberger.

Chairwoman MALONEY. OK.

Mr. SHELLENBERGER. Yes, I mean, I would just—I think that the concern raised about misinformation comes from folks that are also conflating extreme weather and disasters.

So, IPCC and every dictionary I've seen defines disasters as deaths from extreme weather and property damage. Deaths from natural disasters are going down around the world. They've been going down 90 percent. It's just wonderful. We should celebrate it. Fewer of our loved ones are being swept away in floods and hurricanes. All of the increase in property damage is due to the fact that we've become wealthier.

So, the idea that people can see climate change in natural disasters is completely fallacious. That's not science. That's misinformation. Yes, we are able to detect in some extreme weather events a climate signal, but it takes very careful attribution studies.

This effort to mislead people—and, you know, this citation, oh, it's hot in Washington, DC, I see both sides of the aisle. Some peo-

ple say, "Oh, it snowed, therefore there's no global warming." Other people say, "It's hot out. That's proof of climate change." That's all fallacious, completely pseudoscientific, should just be considered—that should not be done. I mean, it's just grossly misleading.

And, somehow, this idea that raising the concern that 50 percent of human beings on Earth say that they think climate change can make humans extinct, the idea that that's not a concern or that the rising levels of anxiety among teenagers should not be a concern, I'm sorry, but if you're a parent, our kids have enough stress in their lives from social media and the status competitions they see every day. They don't need to be told that they may not live long enough to have children. I think that's unconscionable.

Mr. PALMER. Thank you, Madam Chairman. And, at the end, I may want to ask for another round. I yield back.

Chairwoman MALONEY. OK. Thank you.

And I now recognize Congresswoman Wasserman Schultz.

And I will turn the gavel over to Robin Kelly, with my thanks. Thank you.

Ms. WASSERMAN SCHULTZ. Thank you, Madam Chair.

And I thank the witnesses for their time.

What I think has been telling about this hearing so far is that our friends on the other side of the aisle, when presented with hard data and science that doesn't line up with their world view or their politics, deems the conclusions of that hard data and science to be political.

The facts are the facts, and the facts include that rising global temperatures are making natural disasters even more frequent and severe. And that, of course, does impact health and cause damage to critical infrastructure that supports human life.

I live in ground zero, my district includes ground zero, when it comes to the impact of the sea-level rise that is resulting from global warming and the subsequent flooding that occurs even when it's sunny in many coastal neighborhoods that I represent. Dealing with major storms is a way of life for Floridians, and it seems that things are getting much worse in my state thanks to this climate crisis.

According to the U.S. Geological Survey, and I quote, "More heat in the atmosphere and warmer ocean surface temperatures can lead to increased wind speeds and tropical storms. Rising sea levels expose higher locations not usually subjected to the power of the sea and to the erosive forces of waves and currents."

Today, we've heard new research that shows the alarming numbers of deaths that will occur if we fail to address climate change.

Dr. Greenstone, I wanted to ask you a question about your study on extreme heat, whether that includes the number of deaths that will occur due to more severe natural disasters as a result of climate change.

Mr. GREENSTONE. Thank you for the question, Congresswoman.

No, the study only covers temperature-related mortality, and so everything related to natural disasters would be additive.

Ms. WASSERMAN SCHULTZ. OK.

And, Dr. Shindell, same question, please.

Mr. SHINDELL. Yes, our analysis covers those effects of air pollution that we know a great deal about. There are additional effects,

such as impacting the brain and cognitive function and such, that would be additive, and we did not include. And for climate, as with Dr. Greenstone, only heat. So it is, again, a conservative estimate. It's not accounting for everything.

Ms. WASSERMAN SCHULTZ. Thank you.

So, it seems clear that the alarming figures in your research don't even include the impact of natural disasters, which are becoming more frequent and extreme. So, the responses that I just received said that adding natural disasters and their impact that result from the warming climate and sea-level rise are going to make the situation even worse.

Dr. Greenstone, your work at the Climate Impact Lab does include modeling of potential losses from coastal storms under a range of climate change scenarios. Can you give us an overview of the risks to coastal infrastructure if the frequency and severity of storms continues at its current rate?

You know, my state of Florida has so many coastal communities that are already being affected by rising sea levels and increased storm events, and I'm particularly concerned about the increasing reach and intensity of storm surge. We just had a storm come through just over the last couple of days that caused damage as well. And that's often—the storm surge is often the true killer during storm events in Florida.

Mr. GREENSTONE. Yes. Thank you, Congresswoman.

So, that is an area that we are actively working on. And the initial indications are that this will be an important extra factor that would accompany the mortality risk for temperature that I described toward developing a full estimate of the cost of climate change. And I think we expect to have results that we would be happy to share with you and others later in the fall.

Ms. WASSERMAN SCHULTZ. Thank you. That would be incredibly helpful.

And, Dr. Salas, can you explain for us how you believe extreme weather will impact healthcare infrastructure, power grids, and supply chains, especially in coastal communities?

I'm thinking especially of vulnerable populations like nursing home communities, of which there are many in my state, that have suffered greatly during past storm events because of a combination of power outages as well as mismanagement.

Dr. SALAS. Thank you. And you bring up a wonderful point. And this is something that isn't even taken into our current calculations, and that's the fact that we know that, as extreme heat worsens, there's increased risk for power outages, which is cited by the National Climate Assessment put out by this administration. We know that extreme weather, as it's intensified, which is also in—the National Climate Assessment "Human Health" chapter outlines that it's—we know that that's going to cause infrastructure damage.

I mean, as a doctor, I need a building with which to treat patients in, and I need supplies. And we know that it's damaging and disrupting supply chains. We've already seen the fragility of our supply chains now with the COVID–19 pandemic in regard to personal protective equipment and other items. So, there's a suite of

effects that cause patients to not be able to access care exactly when they need it.

Ms. WASSERMAN SCHULTZ. Yes. Your answers reinforce why I believe we need to do everything we can to put a price on carbon, which has been bipartisan in years past, arrest emissions, and transition to clean energy now.

Thank you, Madam Chair. I yield back the rest of my time. Thank you.

Ms. KELLY.

[Presiding.] Thank you.

We will now hear from the gentlewoman from West Virginia, Congresswoman Miller.

Mrs. MILLER. Thank you, Madam Chair and Ranking Member Comer.

And thanks to you all of our witnesses for being here today.

Mr. Shellenberger, thank you for being here today, and thank you for testifying before us for the Select Committee on Climate Crisis. It's my hope that my colleagues here today will treat you with more civility and manners and respect than I feel you got last week. I don't think there's any room for arrogance in our discussions, because we're here to solve problems.

It's my opinion that, if we look back through time, our climate has always been changing. My colleagues have heard me talk before about the devastating impact bad policies and even overregulation have had on West Virginia—the closure of the coal mines, which decimated our communities and caused so many people to lose their jobs and created a terrible hopelessness, which then led to an opioid epidemic.

Even further, our state implemented a renewable change, an alternative energy portfolio that skyrocketed energy costs, which left many people choosing between keeping their lights on and paying for their prescriptions or their groceries.

We must not miss the forest for a tree. Bad policies can affect our citizens' health, both mentally and physically.

Mr. Shellenberger, as you know, our innovations in the natural gas space have led to American energy independence and helped lower our climate emissions. American natural gas is not only cleaner than that of other countries, it helps improve our national security.

Mr. Shellenberger, can you explain how economic growth can lower carbon emissions?

Mr. SHELLENBERGER. Yes, thank you, Congresswoman. I appreciate the question, and I appreciate your remarks about last week. It was quite a startling experience, and it's nice to be able to have a chance to respond today.

Yes, I mean, I think—you know, Dr. Shindell said earlier that the cause of pollution reductions in the past have been due to regulations. That's an overly broad claim. In fact, what I've pointed out is that Obama's proposed Clean Power Plan would have reduced carbon emissions 32 percent by 2030; well, carbon emissions declined 34 percent by 2019.

Now, I would note that the Federal Government did play a positive role here, but it wasn't through—it wasn't primarily through regulation. It was by supporting the natural gas industry in devel-

oping the horizontal drilling and fracking technologies to allow the opening up of shale for oil and gas drilling, which has made the United States a global superpower in terms of energy.

That was fundamentally—and that was also, by the way, a consequence of America's commitment to underground property rights, which is something that doesn't really exist in other countries and which allowed for the fracking boom.

I spoke out for—I'm sometimes mischaracterized as solely in favor of nuclear. In fact, I defended the fracking revolution as it was happening 10 years ago against people that were opposed to it, including supposedly for climate change reasons.

So, we saw this remarkable success. In fact, that's the reason why there is much more reason for optimism in terms of declining carbon emissions globally. Offshore natural gas exploration has significantly lowered the price of natural gas.

And I would acknowledge it's had a negative—it's had a mixed consequence, obviously, for your communities in West Virginia, because folks in the coal mining communities have suffered. In my view, that means that we need to do more to export America's natural gas, which is both good for workers in places like West Virginia and also good for air pollution abroad and good for climate change.

Clearly, the great success story over the last several decades is this abundance of natural gas. It's really the main event. It's what is almost certainly going to allow carbon emissions globally to peak and decline sometime in the next decade or so.

I mean, the fact—yes, carbon emissions are continuing to go up, but they've peaked and have been declining in wealthy countries. They peaked in Britain, France, and Germany in the mid–1970's, by the way. So, poor countries, developing countries will follow what's been happening in developed economies.We see the same pattern everywhere: There is an increase in air pollution as countries industrialize and develop, but then, as they switch to cleaner fuels, including natural gas, they go down.

So, that's the spirit of my remarks, is it's just to say, we should ground ourselves in this incredible success we've had in reducing pollution through a variety of mechanisms, rather than suggesting that things have gotten worse or that somehow things are going to get worse when it comes to natural disasters.

I just would like to just say one thing to object to Congresswoman Wasserman Schultz. In her remarks, she conflated natural disasters and extreme weather events. A hurricane, even one with faster wind speeds, that never touches ground is not a disaster. It's only a disaster if it kills people or causes property damage. And deaths from natural disasters, including in the Unites States, are going down. And property damage, to the extent it's risen, it's risen because we're wealthier.

Ms. KELLY. Thank you. Your time——

Mr. SHELLENBERGER. So, I just think, if we're going to be committed to the science, let's be scientifically accurate about disasters and extreme weather events.

Mrs. MILLER. Do I still have time?

Ms. KELLY. No. Your time has now expired.

Mrs. MILLER. OK. Thank you.

Mr. SHELLENBERGER. Thank you for the time, Congresswoman.

Ms. KELLY. I'd now like to call on the gentleman from Maryland, Congressman Sarbanes.

Mr. SARBANES. Thank you, Madam Chair. Can you hear me?

Ms. KELLY. Yes.

Mr. SARBANES. Terrific.

I want to thank the panel.

The members of this committee, obviously we work in Washington, so we all know how hot it gets here in the summer. And climate change is increasing that trend. Baltimore just had 25 days in July that were over 90 degrees, which we haven't seen before.

According to a study conducted by a researcher at Portland State University, summer temperatures fall unequally on either side of the Nation's racial and economic divide. So, I wanted to talk a little bit about that today.

For example, in Washington, the summers are significantly hotter in neighborhoods with lower incomes and higher minority populations, and we see a similar trend in other cities. In Baltimore, researchers logged a difference of more than 10 degrees Fahrenheit on the same day between poorer and more affluent parts of the city.

And we know what this is connected to. With fewer trees and parks, denser housing, less air conditioning, poor neighborhoods are literally feeling the heat more than their wealthier counterparts.

Dr. Thakur, can you briefly explain the health problems that can arise from regular exposure to hot summer temperatures? And would you say that lower-income communities in general appear to be more vulnerable to some of these dangers, and, if so, could you explain why?

Dr. THAKUR. Thank you for your question. You highlight a really important disparity issue and have nicely described the heat-island effect that we see in urban communities.

It's important to note that African American and Latinx communities are more likely to live in poverty, live near large roadways and highways, and live in poor housing quality. They're also more likely to have less landscaping and trees and more likely to have high concrete areas that absorb heat.

And because of these social conditions, they are also more likely to have chronic health conditions such as respiratory and cardiovascular disease. And climate change, especially extreme heat, worsens these social conditions. And for those with chronic health conditions, they can exacerbate their disease.

So, I'll provide an example with one of my patients, who's a Latino woman with diabetes and asthma, and she cleans homes for a living. And when there are extreme heat days in San Francisco, she can't effectively do her labor-intensive job. She'll have to stop every short while to use her rescue inhaler in order to avoid her breathing from getting worse.

She also risks getting dehydrated on her job during those extreme heat days, which worsens her diabetes.

I also want to note that, when there are fires due to dryer land and hotter air, her asthma becomes so severe that she cannot work and therefore cannot get income.

So, this is just a nice example to illustrate how communities that are disproportionately burdened with the effects of climate change not only see worse health conditions but also see worse economic health—economic results from it.

Mr. SARBANES. Thanks very much. And we have a severe problem with asthma in Baltimore. I'm very familiar with this and some of the effects that you're describing.

We're all trying to do what we can on this front. It may be a little thing, but I think it's important: I was proud to sponsor, with a number of my colleagues, the TREES Act, which would plant trees in low-income communities and increase the tree canopy in areas that have historically lacked green space.

And increasing that green space would not only help with this urban heat-island effect that you're describing but could also help build resiliency by reducing storm water runoff, lowering energy costs for residents, and reducing air pollution, among other benefits that it could have.

Can you speak just for a moment—we've got about 30 seconds—why you think, if you do, that it's important for to us prioritize these kinds of investments in vulnerable communities to promote greener and a more equitable future for all their residents?

Dr. THAKUR. Yes. Of course.

So, green space, as you highlight, improves a lot of different circumstances of the neighborhood. In addition to what you've already highlighted in increasing tree canopy, which helps reduce the heat-island effect, and improving air quality in the area, there are several studies that also show that it also improves mental health.

I think, you know, in communities that are disproportionately burdened by social stress, having green space around can help provide that resilience to the community through mental health benefits in addition to physical health benefits.

Mr. SARBANES. Thank you very much.

I yield back my time, Madam Chair.

Ms. KELLY. Now we will hear from the gentleman from Louisiana, Congressman Higgins.

Mr. HIGGINS. Thank you, Madam Chairwoman.

And, also, I'd like to point out and thank the majority chairwoman, who has left the meeting, for being very gracious regarding recognizing time. In several cases, she's recognized time expired for members on both sides of the aisle and has allowed the final question to be answered. I thank her for that spirit.

Dr. Salas, you had spoken of an elderly gentleman that has come under your care in San Francisco, I believe, that had no air conditioning. Do you recall making that statement, ma'am?

Dr. SALAS. It was in Boston, but yes.

Mr. HIGGINS. It was in Boston. OK. I apologize.

Dr. SALAS. That's OK.

Mr. HIGGINS. Would you be so kind, madam, as to allow my office to reach out to you whereby we can identify that gentleman? And through a Christian charitable organization, we'll get him an AC unit and a couple of fans.

If you could perhaps allow us to reach out to your office, we'll address that particular problem, and, at least, by the end of this committee hearing today, we'll have solved, in some small portion, the

climate challenge for one elderly American. If you would allow that, I would be grateful.

Mr. Shellenberger, if you're there, sir, I'd like you to address, please—I'm going to give you the floor here. Please talk to us about nation-states across the world that have major impact on the climate of the Earth and CO2 emissions, including Russia, China, and India. And please correlate the trends of Russia, China, and India versus the United States, if you don't mind, sir.

Mr. SHELLENBERGER. Sure. I'd be happy to, Congressman, and thank you for the question.

I know that there's been an effort, I think, over the last several decades to deal with climate change through an international treaty and, I think, some sense of competition between countries.

I, myself, am uncomfortable with that, for a variety of reasons. The most important one is just the one I mentioned before, which is that, really, all countries—almost all countries see their air pollution, including carbon emissions, rise with industrialization, and then, as they move toward natural gas and nuclear and improve the cleanliness of their coal burning, they see their emissions peak and decline. And what I'm most troubled by have been efforts to basically try to deny countries economic development.

Right now, the World Bank, for example, which is funded by the United States and other Western nations, has stopped funding large hydroelectric dams and nuclear power plants, even though the former is one of the main ways that poor countries lift themselves out of poverty and nuclear is the only scalable, zero-carbon alternative to fossil fuels.

So, for me, I don't spend much time trying to, kind of, point out that other countries are doing worse than us. I know that's something that a lot of people point out. My view is that China will see its carbon emissions peak and decline just in the same way that the United States and Europe did before that.

And I think we have—the big—much—if we're looking at the international arena, I think a much bigger concern is the overdependence on things like imported solar panels from China, the low-quality jobs that they create here compared to the higher-quality manufacturing jobs in China, and then just the complete—basically what I view as the complete abdication of U.S. responsibility for nuclear energy, which—for 60 years, the United States has been the leader of nuclear energy, and we're in a situation now where basically every branch of—you know, the White House, the Congress, the so-called nuclear energy industry is basically ceding the future of nuclear energy to the Chinese and Russians. I think that's a serious problem——

Mr. HIGGINS. Thank you for that clarification.

Mr. SHELLENBERGER [continuing]. related to climate change but goes beyond it.

Mr. HIGGINS. I join you in support for expanded gradual trends toward very ecologically sound emerging technologies in oil and gas industry and nuclear.

And in my closing seconds, I'd like you to please address the correlation between economic prosperity and stability and how it relates to cleaner air and water and a reduction of pollutants in the planet, please.

Mr. SHELLENBERGER. Sure. I mean, economic growth and air pollution reductions are strongly correlated. After nations achieve a certain level of industrialization, it's a very clear relationship.

You need a heavily capitalized oil and gas industry to be able to make the transition away from coal, which is what's been occurring in the United States; as well as economic development is the main factor in making sure that deaths from natural disasters, that the global disease burden continues to decline.

So, I think the focus on making sure that we protect continued economic growth, which requires cheap energy, I think that has been and should remain our highest priority.

Ms. KELLY. The member's time——

Mr. HIGGINS. Thank you, sir, for the answer.

Madam Chair, my time has expired. I thank you for your graciousness, and I yield.

Ms. KELLY. Thank you.

The chair now recognizes herself for five minutes.

Dr. Shindell, your testimony today is astounding. If we address climate change and keep global warning below 2 degrees Celsius, that would save 4.5 million American lives over the next 50 years. If we don't take action, then 4.5 million Americans will die an unnecessary premature death.

Do I have that right, Dr. Shindell?

Mr. SHINDELL. Yes, that is correct.

Ms. KELLY. So, that is almost 100,000 deaths per year that could be prevented. That's a huge number. That's nearly three times the number of lives we lose in car accidents every year. It's twice the number of deaths caused by opioids in the past few years. And it's even more than the number of Americans we lose to diabetes each year.

Dr. Shindell, are you telling me that we have the chance to make a change now that would save more lives than eliminating diabetes?

Mr. SHINDELL. Definitely. And we tend to not recognize the true toll of air pollution, which is roughly a quarter-million Americans a year. And we have a chance to cut that nearly in half within a decade.

Ms. KELLY. The other thing I wanted to just talk about a little bit, in my district—I represent the Chicagoland area. I'm urban, suburban, and rural. And in the south part, southeast part of my Chicago district, we had to deal with the issue of pet-coke. And we actually had to work with the corporation or fight a corporation because it was all over that part of my district. People had it coming in through their windows, on their food when they ate, depending on, you know, how the wind blew. And they felt like they have more asthma in that area and other illnesses.

And it's just always interesting to me how in communities of color and/or in low-income communities that's where these problems seem to find themselves more. Can you comment on that?

Mr. SHINDELL. That is, unfortunately, all too real across the country, not just in your district. But poorer people can afford to live only in the more polluted areas and have less political clout to keep the, kind of, polluting industries away from themselves.

So, we find the burden is especially large on poor and people of color. It's also especially large on children and the elderly, who are more susceptible.

The 4.5 million is just the number of deaths, but there's a huge toll from morbidity from nonfatal illnesses, like children having bronchitis and asthma.

Ms. KELLY. And then, when you think about, if people don't die, just the healthcare cost to keep people alive is tremendous.

Mr. SHINDELL. That's right. We evaluated that the benefits to American business would be in the billions, more than a billion a year, just from avoided medical spending and increased worker productivity. So, these are tremendous costs which don't show up on the books now but really should.

Ms. KELLY. Then the other thought was, when we talk about people losing their lives, let's talk about young people. It's going to be young children losing their lives too. It's not necessarily that you're growing up into your adult years, but this affects our young children also.

Mr. SHINDELL. Yes, that's——

Ms. KELLY. Or our teens.

Mr. SHINDELL. No, that's very true. And one of the things to keep in mind about both air pollution and climate change is that they affect everybody. You can't simply avoid it; you have to go outside. You have to—you can't live in an area that's not subject to one or both of these problems.

So, they really—they're kind of a common denominator. They affect everybody, rich and poor, which is why we should really all be working together to reduce this problem.

Ms. KELLY. I totally agree. Thank you, Dr. Shindell.

I will yield back the balance of my time and now will call on the Congressman from Tennessee, Congressman Green.

Mr. GREEN. OK. Can everybody hear me now?

Ms. KELLY. Yes.

Mr. GREEN. All right. Thanks.

Thank you, Chairwoman, Ranking Member, and our witnesses.

We have a responsibility to care for the environment. As Americans, we're blessed with a beautiful Nation, abundant natural resources. I am an avid fly fisherman. I want my mountain streams clear, and I do not want my trout growing in—glowing in those streams.

There's an obvious increase in CO2, and with no detected levels this high in history, we really don't know what the outcome's going to be. We know aerial fertilization happens, biomass is increasing, but is it enough? Many scientists' mathematical models suggest it will not be enough, but we simply don't know.

I want to add, too, that the ridiculous claims made by climate alarmists push reasonable people away from this debate. For example, an ice-free Arctic was supposed to happen in 2013 and 2018. Italy was supposed to be underwater in 2005 and 2011. Our colleague has predicted the end of the world is now only 11 years away. In fact, I can list 41 predictions which have all failed to materialize.

Even today, we've heard this horrific story of heatstroke and death. I, too, am an emergency-medicine-trained physician who

trained at the number-one emergency medicine residency program in the country all three years I was in residency. I'm also an ex-Army Special Operations physician who served with Delta Force and SEAL Team Six, providing healthcare in Kuwait, Iraq, and Afghanistan, where the temperatures, I might note, were far more extreme than anywhere in the United States.

But here are some real facts, to use Congresswoman Wasserman's word. The average number of U.S. heat deaths was 138 over the last 33 years. That number has fallen to 103 if you look in the just the last 10 years. And, in 2019, only 63 people died of heat injury.

The number of heat deaths has plummeted over the last 30 years while temperatures have fluctuated up and down but generally risen. There is no correlation between heat deaths and rising atmospheric temperatures. Suggesting that heat injuries is some kind of emergent crisis that we've got to get a handle on is about as bad as saying the world's going to end in 11 years.

A piece of advice for my clinician colleagues here today: If air pollution is decreasing, which all the witnesses today have said it is, and respiratory disease and death is increasing, would you please look for another cause? Please? If air pollution's going down and deaths are going up, look somewhere else. We need to call these ridiculous assertions what they are, so credibility for what is really happening can be addressed.

The fact is you don't have to support socialism to support the environment. Make no mistake, the Green New Deal is socialism. In fact, history shows that socialism has caused the environment far greater harm, whereas free markets improve the environment. I could cite tons of examples.

Climate alarmism——

Ms. KELLY. Mr. Green, can you please turn on your camera? Sorry to interrupt you, but we can't see you.

Mr. GREEN. Oh, no. OK. Should I start over, ma'am?

Ms. KELLY. No, we could hear you. We just couldn't——

Mr. GREEN. OK. OK. I don't know what happened there. I was—I thought I was on, but OK.

Climate alarmism supports political agendas and distracts from the real issues. It also leads to regulations that swing the pendulum far from reality and constrain our people and their innovations which feed the world and, importantly, actually clean the world.

For example, when two raindrops come together, it's not a river. The Federal Government should not control that piece of land where two raindrops come together. In fact, government closest to the people is best for managing the environment. Who better to care for the land than those who stand on it?

I also want to add, we've crossed a threshold in this country. Demand for climate-friendly products/services creates pressures on industry and the marketplace, which is far more powerful and far safer than a socialist, centralized government control.

One last point. Oftentimes, the solutions—the cure is far worse. Huge wind turbines are bird blenders. And the batteries in electric cars have caused toxic substances that will be a problem for years to come. Yes, CO2 is rising and humans are contributing, but let's

get this right. Let's not act to make ourselves feel good. Let's not act to make climate alarmism a club for political opponents. Let's act wisely.

One quick question for Mr. Shellenberger. Can you describe a little more in detail your assertions that mental health injury is increasing and what that means for health, as alarmism scares these children in some cases to death? Your thoughts?

Ms. KELLY. The member's time has expired, but the witness can answer the question.

Mr. SHELLENBERGER. Yes, I'll be brief.

I mean, I think that even in the six months since I submitted my book to my publisher the evidence has grown very significantly. We now have—you know, like I mentioned, 50 percent of people around the world think that climate change will make people extinct. We see that 57 percent of Americans say they're very concerned about climate change. One out of five British children have nightmares about climate change.

I think the big factor is social media is driving rising anxiety and depression, but, clearly, these fears of climate apocalypse are having a significant impact. And it's just—it's really unfair to young people, in particular.

Mr. GREEN. Thank you.

Ms. KELLY. Now I'd like to call on the gentlewoman from Massachusetts, Congresswoman Pressley.

Ms. PRESSLEY. Thank you, Madam Chair.

And thank you to our distinguished panelists for joining us today.

The global climate crisis does pose an existential threat to our planet, and we are already experiencing it in dangerous and destructive impacts. Look no further than my own district, the Massachusetts Seventh, to see how climate change is threatening the public health, especially in low-income communities of color and immigrant communities.

Communities like Roxbury, Chelsea, and Chinatown are enduring harsh heat waves that are hotter, last longer, and occur more frequently. At the same time, these residents too often lack air conditioning or tree cover. Historic redlining has placed these communities in high-pollution zones, and the toxins in the air, combined with higher temperatures, significantly worsen health outcomes.

Today's hearing demonstrates that climate change and public health, they are inextricably linked. The climate crisis is exacerbating our Black maternal and infant mortality crisis. It is causing higher rates of premature deliveries, stillbirths, and low birth weights and is disproportionately threatening Black and Latinx pregnant people, who are more likely to work outdoors and less likely to have access to quality healthcare.

Maternal health workers, midwives, and doulas in my district are working hard to address this problem, but they cannot do it alone. And it is our job in Congress to confront these challenges.

Dr. Salas, according to HHS's Office of Minority Health, Black babies are 3.8 times more likely to die from complications related to low birth weight as compared to White babies. How does climate change contribute to these devastating statistics?

Dr. SALAS. Thank you, Congresswoman Pressley. Good to connect with a fellow Massachusetts individual.

So, you bring up a wonderful point, and that's the fact that the very people who are suffering the most from the climate crisis are those that are contributing the least. And it falls disproportionately on the very groups that you outlined. And that really aligns with what my clinical experience has been in emergency departments. And we've seen it yet again now with the COVID–19 pandemic and certain racial minority groups disproportionately bearing the brunt.

So, I thank you for highlighting that. And I think you also highlight that there are solutions that are available. We just need the political will to implement them.

Ms. PRESSLEY. Well, I won't get into that.

So, I'm going to try to merge two questions here. Can you speak to what ways the current pandemic complicates access to healthcare for those who are pregnant? And, also, do you agree that the fight for our healthcare justice, environmental justice, and racial justice must be tied?

Dr. SALAS. Agreed. Like I said in my opening statements, the climate crisis is a meta problem and a threat multiplier, and so all of these things are interconnected. So, as we think about how to approach solutions, we have to think in a multidisciplinary way that allows us to use our ingenuity to be able to bring all of these diverse sectors together to really approach these problems. Because oftentimes one intervention has multiple benefits and especially in these very groups that you're discussing.

Ms. PRESSLEY. And if Members of this body and this administration continue to ignore the science of climate change, what is at stake for mental and physical health of frontline communities in particular?

Dr. SALAS. So, I am enormously concerned about what the future will look like for those populations based off what I'm already seeing today.

And I think that's—I'm here as a doctor representing my patients, and so I need to advocate for every one of my patients. I'm doing everything I can within the emergency department, but we have to act upstream in order to attack the root cause of these problems, because these patients are going back out and continually getting harmed. That's why we need your help.

Ms. PRESSLEY. Thank you.

I think the time for small steps and half-measures is long time-over, it's expired. It is time for a Green New Deal. It's time to prioritize the preservation of our planet and to mitigate the worst impacts of climate change in our communities.

Thank you, and I yield.

Ms. KELLY. Thank you.

Dr. THAKUR. Chairperson Kelly, may I respond to Chairperson Green? He had called out the role of the clinicians on this committee—on this panel today, and I just want to get a chance to respond to what he brought up, specifically around air pollution and respiratory diseases.

Ms. KELLY. You may respond.

Dr. THAKUR. Thank you.

As Chairwoman Pressley highlighted, the disproportionate burden of air pollution and climate change effects have been in communities of color and in low-income communities. I want to also highlight, when we think about these communities, it's also where we see asthma prevalence to be the highest.

And you are absolutely correct that air quality has improved over the years, but it has not improved that much in those communities. In fact, earlier in this hearing, I brought up that, despite tightened regulations, nitrogen dioxide levels, which is a traffic-related air pollutant that I, myself, in my own work, have shown to be associated with asthma, is still 37 percent higher in non-White communities.

So, it's, therefore, not surprising that communities that are still seeing a rise in asthma occurring also carry the greatest air pollution burden.

Ms. KELLY. Thank you so much.

Now I'm going to call on Congressman Keller from Pennsylvania.

Mr. KELLER. Thank you, Madam Chair.

On any given day, Pennsylvania's 12th congressional District provides roughly 10 percent of our Nation's natural gas supply, lowering America's energy bills and powering the Nation. Carbon emissions have been declining in this country for nearly 15 years, due in part to the cost-effective natural gas coming out of places like north-central Pennsylvania.

Thanks to President Trump's efforts, we are now energy-independent and are relying less on foreign governments to help us produce energy. As EPA Administrator Wheeler puts it, Americans are breathing the cleanest air since 1970. And criteria air pollutant emissions under President Trump dropped seven percent since 2017.

The Trump administration has shown that improvements in public health and economic growth can take place at the same time. So, that leads me to some questions for Mr. Shellenberger.

What is the return on investment for solar and wind energy compared to natural gas?

Mr. SHELLENBERGER. Thank you for the question, Congressman.

I am sorry, I don't have the exact numbers for the return on investment. What I do know is that there are—that every state that has implemented serious renewable-energy mandates has seen their electricity costs go up. In fact, it was Michael Greenstone who did the study showing that renewable mandates increased the cost of electricity by $125 billion and in California they went up sixfold more than they did in the rest of the United States.

What should've occurred is that our electricity prices should've gone down because of the reason you mentioned, which is the natural gas revolution that we've experienced. In fact, electricity prices would've risen even higher in California and in those other states had it not been for the significant declines in the cost of natural gas.

Mr. KELLER. And the energy rates would've increased for low-income Americans. Therefore, they would not be making those climate control efforts of air conditioning, so on, more out of reach for low-income Americans.

Mr. SHELLENBERGER. Absolutely correct. Making energy more expensive is the most regressive thing you can do, because energy is used in every part of the economy. So, it's food, it's transportation, it's consumer products. So, I mean, it's ironic to me that so many people that are committed to progressive taxation embrace the most regressive thing you can do for poor people and people of color, which is to make energy more expensive.

Mr. KELLER. Thank you.

Also, can you explain why the U.S. carbon emissions have been declining for over a decade?

Mr. SHELLENBERGER. Yes. As I mentioned earlier, clearly, the major factor for it is the natural gas revolution.

Again, I think the most telling statistic is that, under President Obama's proposed Clean Power Plan, carbon emissions would've been reduced 32 percent by 2030 from the power sector; instead, they declined 34 percent by 2019. That's remarkable.

It's proof that, while pollution regulations might have a role to play, they were not the main factor in resulting declining carbon emissions and those important declines in energy costs as a result of the gas revolution.

Mr. KELLER. Yes. So, thank you. I really, really appreciate that. Because it is about making sure that we do have a clean environment, but it should include all of the above, and we shouldn't be discounting natural gas or other energy sources that really make energy affordable for all of us but most importantly low-income individuals.

So, it's clear to me that we need to be making smart investments in American energy, continuing the exceptional work of this administration, and looking at what they've done to lower carbon emissions and continuing to pursue economic growth.

With that, I thank you, and I yield back.

Mr. SHELLENBERGER. Congressman, may I make one more point?

Mr. KELLER. Yes.

Mr. SHELLENBERGER. We've heard a lot about how essential air conditioning is. And I share the concerns, by the way, about continuing racial disparities in terms of the penetration of air conditioning. Air conditioning is literally a lifesaver, particularly for elderly and people with preexisting conditions, who tend to be most negatively affected by heat waves.

One of the most important things that determines how frequently you can operate your air conditioner is the cost of energy. It's the cost of electricity.

So, if you want to see poor people and people of color have greater resilience to heat waves and fewer deaths from heat waves, then you should want cheaper electricity, since often what we find in these studies is that air conditioning is not used enough during hot periods because people are worried about the high cost of powering them.

Mr. KELLER. That would also help our senior citizens who are on fixed incomes.

So, thank you.

Mr. SHELLENBERGER. Thank you, sir.

Mr. KELLER. I yield back.

Mr. GREENSTONE. Madam Chairwoman, this is Michael Greenstone. I wondered if I could respond since my research was brought up.

Ms. KELLY. We'll let you take a few minutes to respond.

Mr. GREENSTONE. Sure.

I just—Mr. Shellenberger correctly noted that I have done some research that indicates that renewable portfolio standards increase the cost of electricity. And I just want to step back from it. I agree with my own paper, so I don't dispute what he said. But it's a very strange—there's kind of a strange thread to the way he's making his argument here, which is that we should only look at the cost of renewable portfolio standards or other carbon policies, and there's a failure to compare the cost to the benefits.

And what my testimony today was about was that there are substantial and indeed much larger benefits from reducing carbon than we had previously understood. So, the kind of decisionmaking that we would hope government would make would be to compare the costs and the benefits of different actions and not only look at one side of the equation.

And I will just add that, you know, a completely level playing field which accounted for all the costs of different energy sources imposed on society, I would strongly advocate for that. And I think that there are plenty of opportunities to introduce policies like that that would indeed have benefits that greatly exceed the costs.

Thank you.

Ms. KELLY. Thank you.

Mr. SHELLENBERGER. May I briefly respond, Chairwoman?

Ms. KELLY. I'll give you the last word. Yes.

Mr. SHELLENBERGER. Very briefly.

I agree we should count costs and benefits. So, if my remarks were interpreted as suggesting we shouldn't, then let me clarify by saying of course we should.

But I also don't think that it necessarily means—I think, as what we saw with the big reductions in carbon emissions from natural gas, that it doesn't necessarily come at a higher economic cost.

In fact, the whole, long tradition of energy transitions—and there's been studies, there's been dozens or hundreds around the world. Energy transitions occur primarily when the new source of energy becomes cheaper than the incumbent. In other words, per unit of energy, the cost of energy has been going down as we become—as sources of energy become cleaner.

In terms of a level playing field, I just think we should be aware that what that would mean is that solar and wind producers would need to pay for the cost of the disposal of their waste products, including the decommissioning of their plants, which they are currently not paying.

And I would also suggest—and you may agree, Michael—is that they should also pay for the high cost of their integration into grids. The cost of integrating intermittent solar and wind onto the grid is significantly higher, given their unreliability, than it is for a natural gas or a nuclear power plant.

Ms. KELLY. Thank you.

Dr. Salas, any last comment?

Dr. Salas, do you have any last comments?

Dr. Salas, can you hear me? Do you have any last comments?

Dr. SALAS. Sorry. I was having trouble with my audio.

I just—the one thing that I will add is just the fact that there's been discussion about the fact that there are benefits and that there have been improvements that have been made in regard to air pollution. I think the one thing I would stress is that I often think in terms of air and health analogies. I think about it as someone who has cancer. So, let's say that they get a treatment and their cancer has improved just a little bit, but yet there's another treatment that actually will get rid of the cancer completely.

So, yes, we can, you know, applaud the fact that there has been some improvement, but we actually have another treatment that can actually get to the root cause and actually eliminate the exposure completely. So, in my mind, as a doctor, for me to not implement or offer that other treatment would be malpractice.

I think we just really need to think about the fact that we can actually get to the root cause and be able to not just celebrate small gains but actually eliminate the disease completely.

Ms. KELLY. Thank you.

Dr. Shindell?

Mr. SHINDELL. Yes. Thank you.

Well, I would like to address a few of these economic issues that keep coming up here. In particular, I'd like to point out that, in places in the United States with competitive energy markets, the market is, again, leading the way with transitions to renewables, because they are simply cost-effective. And solar, including battery storage, is winning competitive bids throughout those parts of the country, mostly in the West, where bids are open to the lowest bidder.

So, I think we are seeing that market forces can move us in the right direction. The problem is, they don't move us quickly enough to meet the kind of targets that we have committed to and all of the world is committed to, which are keeping temperatures below 2 degrees, with the idea that that is necessary to protect public health.

What I have found in my research and I just want to reiterate is what I would consider really positive news, that, by dealing with the climate crisis, by transitioning away from fossil fuels, we automatically get, at the same time, enormous public health benefits right here at home from our own actions.

And those are predominantly driven by improvements in air quality. Cleaning up the air affects those people—affects everybody in the United States, but it is especially pronounced in those with preexisting conditions, the poor, people of color, those who are subject to the worst consequences of air pollution already.

At the same time, it affects all businesses. Because, while fossil fuel use brings a lot of profit to a small section of the economy, it causes an enormous harm that every other aspect of the American economy picks up. So, we all pay higher insurance premiums, we all have lower worker productivity, we all pay higher damage insurance premiums because of the consequences of climate change.

So, dealing with this is a real way for the United States to have both a clean environment and a healthy economy. Nobody is talking about limiting economic growth or people sitting in the dark.

What we're aiming for here is taking advantage of existing technologies that are cheaper, cleaner, and better. And these can really lead us to a place that I think we should actually feel very happy, that everything we do to deal with climate change is not simply a wrenching, difficult transition but has the possibility to make lives better on the ground, especially for public health, as we've been talking about today, but also for many other aspects of our environment—recreation, et cetera.

Thank you again for hosting this important hearing, and it's been a privilege to take part.

Ms. KELLY. Thank you.

And last but certainly not least, Dr. Thakur.

Dr. THAKUR. Thank you.

I came here today as a practicing pulmonologist to be able to tell my patients' stories and how they're impacted by climate change. You know, we've reviewed many of the studies, and there are hundreds more, that have demonstrated how greenhouse gas emissions have already changed our climate over the past several decades, you know, caused the heat waves to happen more often and last longer, lead to dangerous spikes in ground-level ozone, increased wildfire activity in many parts of the United States, including near my home in California, and longer and more potent pollen seasons.

So, these effects hurt American families, and my healthcare colleagues and I are already seeing these effects among our patients. In my testimony today, I shared my patients' stories to illustrate how climate change is impacting us now and affects my everyday practice caring for patients, especially those who are most vulnerable—the elderly, those with chronic medical conditions, and those from historically disadvantaged communities.

So, one common theme I hope that I've left you with today is that climate change is impacting my patients' health now, and, as a physician, it is my job to help improve the health of my patients.

And while it was raised that there are some solutions in place, such as air-conditioned cooling centers, malls, and things like that to address heat waves, this isn't enough. These are Band-Aids. We have an ongoing climate change problem, and the heat—and the Earth is just getting hotter. These things will only last for so long, and we need to do better to address the root sources and aim for cleaner air.

I think when we as a country address climate change, we redeem immediate health benefits right here in the United States, as outlined by Dr. Shindell and Dr. Greenstone. As a mom, a doctor, and a representative of the American Thoracic Society, I favor us taking firm steps to address climate change because I support clean air and a healthy future for all Americans.

Thank you again for having this important session today.

Ms. KELLY. Thank you.

I would like to take a moment to recognize a critical perspective on climate change—our Nation's youth. Seventeen-year-old Gretchen Upton of Shreveport, Louisiana, a member of the youth-led Sunrise Movement wrote to the committee. I wanted to quickly read a portion of that letter.

She wrote, and I quote, "The strength I found in Sunrise was strength to fight for a just future, a livable future, with good, clean

jobs and safe homes; strength to remember that we are the majority who just want to live in a world where it's safe to open up our windows and let the breeze in."

Without objection, Gretchen's statement shall be made a part of the record.

Ms. KELLY. And, also, in closing, I want to thank our panelists for their——

Mr. COMER. Madam Chair?

Ms. KELLY. Yes?

Mr. COMER. Yes. You allowed the majority witnesses to give a closing statement. I was wondering if you would allow the minority witness, Mr. Shellenberger, to give a closing statement.

Ms. KELLY. I allowed him to give a closing statement also.

Mr. COMER. Thank you.

Ms. KELLY. Uh-huh.

Mr. COMER. Oh, you're going——

Ms. KELLY. No, he already did it.

Mr. COMER. OK.

Ms. KELLY. All right.

In closing, I want to thank our panelists for their remarks, and I want to commend my colleagues for participating in this important conversation.

With that, without objection——

Mr. PALMER. Madam Chair? Madam Chair?

Ms. KELLY. Yes?

Mr. PALMER. May I be recognized?

Ms. KELLY. Yes.

Mr. PALMER. Thank you.

Ms. KELLY. Mr. Palmer.

Mr. PALMER. Thank you, Madam Chair.

I would like to submit some documents for the record, if I may.

I have a paper from the National Bureau of Economic Research that verifies what we were talking about earlier about inexpensive heating reduces winter mortality. It saves lives.

And I'd like to introduce into the record from the state of the Planet a report, "Can Removing Carbon from the Atmosphere Save Us from Climate Catastrophe?" And it outlines a lot of the new technology that is out there that validates what Dr. Shellenberger's been talking about, that we shouldn't be perpetuating fear. We ought to be talking about the prospects that we have for improving our climate, for reducing the impact of climate change through the use of technology and the use of nuclear power.

So, if I may, I would like to submit those two for the record.

Ms. KELLY. Did you email these documents to the clerk in advance?

Mr. PALMER. No, ma'am, I wasn't aware that that was a prerequisite. In previous times, the rules allowed a member to bring the documents to the hearing, but, obviously, we're not together. But I think you know me well enough to know that these are not bogus; they're substantive.

Ms. KELLY. There was notice, but, without objection, it shall be submitted to the record.

Mr. PALMER. I will obey the rules in the future. Thank you, Madam Chairman.

Ms. KELLY. You're welcome.

So, with that——

Mr. COMER. Madam Chair? One last thing, Madam Chair.

Ms. KELLY. Yes, sir.

Mr. COMER. Dr. Shellenberger was responding to a question. I don't believe he was given an opportunity for a last statement. So, once again, on behalf of the minority, I would request that our witness, Dr. Shellenberger, has an opportunity for a brief closing statement.

Ms. KELLY. Dr. Shellenberger, because I'm a nice person and I believe in being fair, I will give you your opportunity.

Mr. COMER. Thank you, Madam Chair.

Mr. SHELLENBERGER. Thanks, Madam Chairwoman. I really appreciate it. I'll be very brief. A much more positive experience this week than last week, so thank you very much. It's much better to be able to have this conversation than to have this conversation shut down.

I'll just say it feels like there's been a shift in some of our perspective here. I've seen more acknowledgment of the very significant improvement that we've made in the natural environment and the very large reductions in air pollution that have occurred, some of which are over 90 percent, including for communities of color, while recognizing there are still racial disparities we need to address.

I would just also suggest that, while I may disagree with some of the other experts today on many of these issues, I know that we all care about the same things, and I think it's important to remind ourselves that we share similar values.

One of the things, obviously, we disagree about is whether renewables are really an important climate solution. I think it's fine to disagree about that, but it seems to me that one question for this committee is, if you think that renewables are already cost-effective or cheaper than the grid, then why would we need to spend $2 trillion subsidizing them? I think that's an important question that needs to be fully addressed.

But, once again, I very appreciate your graciousness and the allowance of this conversation today, Chairwoman. Thank you.

Ms. KELLY. Thank you.

So, I want to give Mr. Greenstone—if he felt that he didn't make a closing statement, I want to give you that opportunity.

Mr. GREENSTONE. I'll just summarize what I think is the point of my testimony and what I see as the larger, broader issue here. And I think we're taking a very—there's a risk that we're taking a very simple issue here and making it much more complicated than is necessary. So, let's just start with the facts.

Climate change is going to impose very substantial costs on our well-being. The new research that I did with my colleagues says that the mortality risk from temperature change—the costs of that are at least an order of magnitude larger than was previously understood. I think that's cause for a revision of our understanding of the damage of climate change. That's one.

Two, switching from a high-emissions scenario, which is very similar to what we're on now, to a moderate-emissions scenario has the potential to be one of the greatest public health policies of all

time. It would protect the lives of people in the United States—I highlighted some of the districts it would benefit the most—and people around the world.

I would then—just two final points—the current estimates of social cost of carbon, which play a central role through our regulatory policy, are substantially smaller than I think the evidence suggests. And the work that I released this week with my colleagues would imply that just the mortality risks are five times larger than the complete costs—estimated costs of climate change that the Trump administration have in place.

And my final point is, I think there are many, many policies that are available, all of which would have the flavor of causing fossil fuels to be penalized for their contribution to climate change and would level the energy playing field in a way that I think people would have a hard time disagreeing with, that would produce benefits that exceed the costs.

Thank you very much for the opportunity to participate.

Ms. KELLY. Thank you.

And I'm going to try this again.

In closing, I want to thank our panelists for their remarks, and I also want to commend my colleagues for participating in this important conversation.

With that, without objection, all members will have five legislative days within which to submit additional written questions for the witnesses to the chair, which will be forwarded to the witnesses for their response.

I ask our witnesses to please respond as promptly as you are able.

Ms. KELLY. This hearing is now adjourned.

[Whereupon, at 2:27 p.m., the committee was adjourned.]

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