

**Hearing on The Economic and Health
Consequences of Climate change**

HEARING
BEFORE THE
COMMITTEE ON WAYS AND MEANS
U.S. HOUSE OF REPRESENTATIVES
ONE HUNDRED SIXTEENTH CONGRESS
FIRST SESSION

May 15, 2019

Serial No. 116-20

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COMMITTEE ON WAYS AND MEANS
Hearing on The Economic and Health Consequences of Climate Change
Wednesday, May 15 2019 – 10:00 AM
Witness List

Katherine Marvel, Ph.D, Associate Research Scientist, Columbia University and NASA Goddard Institute for Space Studies

Ashish Jha, M.D, Director, Harvard Global Health Institute

Roy Wright, President and CEO, Insurance Institute for Business & Home Safety

Ted Halstead, Chairman & CEO, Climate Leadership Council

Rich Powell, Executive Director, ClearPath



HOUSE COMMITTEE ON WAYS & MEANS
CHAIRMAN RICHARD E. NEAL

ADVISORY

FROM THE COMMITTEE ON WAYS AND MEANS

FOR IMMEDIATE RELEASE
May 8, 2019
No. FC-11

CONTACT: (202) 225-3625

Chairman Neal Announces a Hearing on The Economic and Health Consequences of Climate Change

House Ways and Means Chairman Richard E. Neal announced today that the Committee will hold a hearing entitled “The Economic and Health Consequences of Climate Change” on Wednesday, May 15, 2019 at 10:00 a.m. in room 1100 Longworth House Office Building.

In view of the limited time available to hear witnesses, oral testimony at this hearing will be from invited witnesses only. However, any individual or organization not scheduled for an oral appearance may submit a written statement for consideration by the Committee and for inclusion in the printed record of the hearing.

DETAILS FOR SUBMISSION OF WRITTEN COMMENTS:

Please Note: Any person(s) and/or organization(s) wishing to submit written comments for the hearing record can do so here: WMdem.submission@mail.house.gov.

Please ATTACH your submission as a Word document, in compliance with the formatting requirements listed below, by the close of business on Wednesday, May 29, 2019.

For questions, or if you encounter technical problems, please call (202) 225-3625.

FORMATTING REQUIREMENTS:

The Committee relies on electronic submissions for printing the official hearing record. As always, submissions will be included in the record according to the discretion of the Committee. The Committee will not alter the content of your submission, but reserves the right to format it according to guidelines. Any submission provided to the Committee by a witness, any materials submitted for the printed record, and any written comments in response to a

request for written comments must conform to the guidelines listed below. Any submission not in compliance with these guidelines will not be printed, but will be maintained in the Committee files for review and use by the Committee.

All submissions and supplementary materials must be submitted in a single document via email, provided in Word format and must not exceed a total of 10 pages. Witnesses and submitters are advised that the Committee relies on electronic submissions for printing the official hearing record.

All submissions must include a list of all clients, persons and/or organizations on whose behalf the witness appears. The name, company, address, telephone, and fax numbers of each witness must be included in the body of the email. Please exclude any personal identifiable information in the attached submission.

Failure to follow the formatting requirements may result in the exclusion of a submission. All submissions for the record are final.

The Committee seeks to make its facilities accessible to persons with disabilities. If you require special accommodations, please call (202) 225-3625 in advance of the event (four business days' notice is requested). Questions regarding special accommodation needs in general (including availability of Committee materials in alternative formats) may be directed to the Committee as noted above.

Note: All Committee advisories are available [[here](#)].

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THE ECONOMIC AND HEALTH CONSEQUENCES OF CLIMATE CHANGE

Wednesday, May 15, 2019

House of Representatives,
Committee on Ways and Means,
Washington, D.C.

The Committee met, pursuant to notice, at 10:03 a.m. in Room 1100 Longworth House Office Building, Hon. Richard Neal [Chairman of the Committee] presiding.

*Chairman Neal. The committee will come to order. Good morning, and welcome to our witnesses and audience members, and thank you all for being here today.

Today marks the first time in 12 years that the Ways and Means Committee has held a hearing on climate change. How long ago was that? Twelve years ago the iPhone wasn't available for sale yet. Twelve years ago you had to raise your arm to hail a cab, rather than tapping your phone. And 12 years ago the Patriots had a mere 3 Super Bowl victory titles.

[Laughter.]

*Chairman Neal. So we won't be calling the question.

To say that this hearing is long overdue is a gross understatement. Since that last hearing the effects of climate change have become only more pronounced: 6 of the 10 hottest years on record were in the last 12 years, including the last 5 consecutive years, and sea levels are rising even faster now than they were in the 1990s. At this rate they are set to rise between one and four feet in less than a century.

Major climate events are affecting hundreds of thousands of people in the United States. On a global scale that number rises to millions. Our colleagues from California can speak directly to what the growing frequency of wildfires means in communities that they represent. And our colleagues in the Carolinas know the devastation and tremendous loss of life from hurricanes and floods.

While some continue to doubt the relationship between these events and climate change, the scientific community agrees that

increasing temperatures towards our oceans and the planet exacerbate the intensity of natural disasters. In fact, the world's leading climate scientists have warned that we have less than a dozen years to limit global warming to 1.5 degrees Celsius. Exceeding that level by even half a degree will certainly worsen droughts, floods, extreme heat, and storms, and this will all push hundreds of millions of people deeper into poverty.

I convened today's hearing to explore climate change and how it is affecting several issues in our committee's jurisdiction, and to discuss the opportunities for our committee to address them together. To do so we must accept today's realities.

First, climate change is real. The business community understands this and savvy companies are already planning accordingly.

Second, climate change is harmful. The witnesses today will speak in detail about its negative health and economic consequences.

And finally, it is time for Congress to get on board. We cannot rely solely on the business community to solve this problem for us. The Federal Government has a significant role to play in creating real pathways for meaningful, long-term economic growth that creates solutions to reduce carbon emissions.

In March the UN General Assembly president delivered a powerful speech that should serve as a warning to all policymakers, worldwide: "We are the last generation that can prevent irreparable damage to this planet.'" We must seize this

opportunity to work together towards a comprehensive solution to this crisis. We can grow our economy, reduce carbon emissions, and promote growth that will ensure that our farm lands, our shore lands, our forests, and our cities are preserved for future generations.

This committee has the tools at our disposal to drive innovations, spur technological advancement, and usher in an era of economic and environmental security and prosperity for years to come. We certainly have a moral imperative to act, and we should act now.

[\[The statement of Chairman Neal follows:\]](#)

*Chairman Neal. And just before I would normally proceed to recognize Mr. Brady, who is on his way, what the chair will do is allow Mr. Brady to offer an abbreviated opening statement after he gets here.

So with that I would like to introduce our witnesses. We have a distinguished panel of witnesses here today with us to discuss the economic and health consequences of climate change.

First, Dr. Katherine Marvel. Dr. Marvel is an associate research scientist at the NASA Goddard Institute for Space Studies and Columbia University's engineering department of applied physics and mathematics. Her work focuses on climate modeling to better predict the earth's future temperature changes.

Next let me welcome Dr. Ashish Jha. He is the director of the Harvard Global Health Institute, dean for global strategy, and the K.T. Li professor of global health at Harvard University. His research focuses on improving the quality and cost of health care systems, with a specialized focus on policy impacts.

Our next witness is Roy Wright, president and CEO of the Insurance Institute of Business and Home Safety, a nonprofit organization that conducts scientific research to identify and promote the most effective ways to strengthen property against natural disasters. Mr. Wright has previously served in the Federal Emergency Management Association.

Next we have Ted Halstead, who is chairman and CEO of the Climate Leadership Council. Mr. Halstead and the Climate Leadership Council work to convene global leaders around cost-

efficient and equitable solutions to climate change.

Finally, let me introduce Rich Powell, who is the executive director of ClearPath, a Washington D.C. nonprofit focused on clean energy innovation. Mr. Powell's previous private sector work has included corporate clean energy strategy, government low carbon growth strategy, and clean tech market entry.

Each of your statements will be made a part of the record in its entirety, and I would ask that you summarize your testimony in five minutes or less. And to help with that there is a timing light at your table. When you have one minute left the light will switch from green to yellow, and then finally to red when the five minutes are up.

Dr. Marvel, would you please begin?

STATEMENT OF KATHERINE DREW MARVEL, ASSOCIATE RESEARCH SCIENTIST
AT NASA GODDARD INSTITUTE FOR SPACE STUDIES AND COLUMBIA
ENGINEERING'S DEPARTMENT OF APPLIED PHYSICS AND MATHEMATICS

*Ms. Marvel. Thank you very much for the opportunity to be here. I am a climate scientist working at Columbia University and the NASA Goddard Institute for Space Studies, but I am testifying here as a private citizen.

In the 1820s scientists began to understand the physics of greenhouse gases. In the 1860s we obtained experimental proof that carbon dioxide traps heat. The first scientific paper to connect increasing CO₂ to global warming appeared in 1896. Since then humans have increased atmospheric carbon dioxide by about 45 percent, and the planet has warmed by about 2 degrees Fahrenheit.

Scientists know that climate change can be influenced by natural factors, but these are not responsible for the long-term climate changes we have observed. Over the past 30 years solar output has not increased, but Earth has continued to warm. Major volcanic eruptions can temporarily cool the planet, but can't explain the long-term warming.

We also know that climate change occurs against a backdrop of natural variability: the seasons, day-to-day weather, and natural cycles like El Nino. But we know of no natural cycle that could result in such a long-term sustained warming. If one believes that the warming is natural, one must also explain why the physics of greenhouse gases, something well understood for over a century, would not apply here.

I have sometimes heard people say that the climate has changed before, as if that were evidence that humans could not be causing present-day climate change. This is like telling a detective hunting for a serial killer that people die of natural causes.

In fact, understanding how the climate has changed in the past is crucial to understanding present-day human-caused warming. The last time carbon dioxide levels were this high was three million years ago, before humans existed, and when sea levels were perhaps up to 75 feet higher. The Earth's past provides powerful evidence that carbon dioxide and climate are connected, and that sweeping climate changes can result in mass extinctions. But these natural processes occurred over thousands or millions of years. Because of human activities, CO₂ is now entering the atmosphere much, much faster.

So how much of global warming are humans causing? All of it. The recent U.S. National Climate Assessment found that between 93 and 123 percent (sic) of the observed temperature increase was due to human activities.

Climate change is not just a problem for future generations; it is already here. Scientists have observed shifting rainfall patterns, changes in cloud cover, increased humidity, and rising sea levels -- almost seven inches over the last century. We have seen the lower atmosphere, the troposphere, warm, while the stratosphere cools: a pattern characteristic of carbon dioxide, but impossible to achieve with increased solar activity.

Observations of the atmosphere and ocean, from the tropics

to the poles, taken from space and the ground, and compiled by different research groups and countries all add up to a consistent picture of change.

We are already experiencing extreme events that can be linked to climate change. Warmer air temperatures make heatwaves more frequent and severe; warmer air holds more water vapor and drives increased evaporation, leading to both heavier downpours and more extreme droughts; warmer ocean temperatures provide the energy to fuel stronger hurricanes; warm and dry conditions increase the risk of wildfires.

If human-caused emissions of greenhouse gases continue to increase, we can expect warming of up to 10 degrees Fahrenheit by the end of the century. For reference, the difference between now and the last Ice Age: eight degrees Fahrenheit.

Even at the low end of the predicted range, we are heading for potentially irrevocable damage to vulnerable peoples and systems. Sea levels will rise between one and perhaps up more than four feet. More than a million species could go extinct. And these changes could destabilize society.

The science is clear. There is no status quo. Change is inevitable. It is coming, one way or the other. But the fact that we understand what is causing climate change gives us power. It means we can choose the change we experience. We can choose to continue on our current path, which the science indicates will lead to disruptive climate changes. These will be, at best, economically devastating for many and, at worst, catastrophic for all. Or we can choose to take charge, which means taking urgent

action today to rapidly reduce emissions.

I am a physicist, so I can only tell you what the climate consequences of these choices might be. But as a human being and a citizen, I hope that we will seize the opportunity to create the future that we want. Thank you.

[\[The statement of Ms. Marvel follows:\]](#)

*Chairman Neal. Thank you, Dr. Marvel.

Dr. Jha, would you proceed?

STATEMENT OF ASHISH JHA, M.D., MPH, DEAN FOR GLOBAL STRATEGY AT HARVARD'S T.H. CHAN SCHOOL OF PUBLIC HEALTH AND THE DIRECTOR OF THE HARVARD GLOBAL HEALTH INITIATIVE

*Mr. Jha. Good morning, Congressman, and thank you so much for having me here.

Recently, working as a physician at the Boston VA Health Care System, I took care of a 72-year-old veteran that I will call Taylor Jones. A Vietnam veteran, he arrived one summer morning nauseated, lightheaded, feeling terrible. In the emergency room he was found to have kidney failure, and quickly admitted for dialysis. As I sorted out what happened to him, I realized he was on a diuretic medication for his heart disease, a medicine that in the middle of a Boston heatwave had caused him to become profoundly dehydrated, shutting his kidneys down.

Mr. Jones's dialysis went smoothly. But the next day he had a heart attack, and two days later he passed away. He had survived the sweltering jungles of Vietnam, but he had succumbed to the sweltering heat of Boston. Mr. Taylor Jones, the Army veteran who had served our country so admirably, was the human face of climate change.

So, for many, climate change is a distant, in-the-future event. For me, as a physician, and as a public health expert, I believe and I see climate change as a threat to human health today in America, in Boston, and America, and around the world.

Let's look at the evidence. What we know is that climate change is leading to more severe cases of asthma and related

respiratory diseases driven by allergy seasons that are getting more intense and longer; rising temperatures that lead to higher ozone levels; and particle matter that comes from burning fossil fuels. These respiratory diseases are deadly, and they are expensive. And the most vulnerable to these diseases are our children and the elderly.

Burning of fossil fuels has substantial negative effect on cardiovascular health: heart attacks, strokes, heart failure. Pregnant women have been found to have higher rates of complications when they are exposed to particulate matter associated with burning fossil fuels.

Climate change is exposing us to new diseases. A recent CDC report estimated that there was a tripling of vector-borne diseases, conditions like Lyme disease, and West Nile Virus driven by warming temperatures. It turns out that the ticks and mosquitoes that carry these diseases find warmer climates more hospitable. The arrival of Zika on our shores was a harbinger of what is to come in the new reality under climate change.

And last, but certainly not least, the effects of major storms on the health of the people in their way cannot be overestimated. While we often think about the people who die in the immediate aftermath, the real health effects come from the days and weeks that follow when displaced individuals can't access the care they need, and when health care infrastructure has become disabled. We saw this with Hurricane Maria, as we have seen it with so many other storms.

The financial costs of these health threats are large and

growing. Each of these diseases -- asthma, heart disease, stroke -- is expensive to manage. Higher incidence and severity of these will further increase health care spending in our nation. And given that the most vulnerable are the elderly and children, it will be the public payers, Medicare and Medicaid, that will pick up the bill.

Our health care infrastructure is not ready. We have seen repeated tragic stories of patients dying in hospitals and nursing homes that were incapable of dealing with the aftermath of major storms, whose intensity has been made worse by climate change. And the financial costs of rebuilding these institutions run into millions, if not billions of dollars.

The health care sector is responsible for approximately 10 percent of all greenhouse gases in our country. That is a very large footprint. Leading organizations that represent doctors and nurses, from the American Medical Association to the American Academy of Pediatrics, have taken a leadership role in calling for climate action because they know that the health of our population is at risk.

So what can we do? The good news is there is a lot that we can do.

First, we have to reduce our dependence on burning fossil fuels. Not only are they a major source of greenhouse gases, but their byproducts are harmful to human health. It turns out clean energy is not just good for the planet, it is good for our bodies. And I believe that putting a price on that carbon to fully account for all the health and economic costs of that

pollution is the best way to move forward.

The health care industry has to do more reducing its own carbon footprint, as well as climate -- sorry, as well as climate-proofing its infrastructure. CMS has played a helpful role by requiring hospitals to focus on resiliency. A small number of institutions are starting to make changes, but most other institutions are not doing enough.

And finally, we need more research and data on the -- and surveillance on the day-to-day effects of climate change. We should debate the best ways to move forward, but we need a common book of facts that help us start with the same starting point.

We are at a pivotal moment, I believe. Climate change has gone from the theoretical to the real, from the future to the present. And the health effects of climate change are being felt across our nation. We need our leaders to act.

I think back to my patient, the Army veteran, Mr. Jones. I remember the conversation I had with his widow the day after he died. She asked me to explain what went wrong, and I told her that the -- and I told her that the heat wave had upset her husband's fluid balance and sent his kidneys into failure. I don't know if actions by previous leaders would have saved Mr. Jones, but what I do know is that there are many like him, veterans and others, who are vulnerable to the health effects of climate change, for whom all of us need to act. Thank you very much.

[\[The statement of Mr. Jha follows:\]](#)

*Chairman Neal. I thank the gentleman.
With that let me recognize Mr. Wright.
Would you please proceed?

STATEMENT OF ROY WRIGHT, PRESIDENT AND CEO OF THE INSURANCE
INSTITUTE FOR BUSINESS AND HOME SAFETY

*Mr. Wright. Good morning, Mr. Chairman, Mr. Buchanan, and members of the committee. I am Roy Wright. After years of leading FEMA's work on flood insurance and disaster resilience, today I have the honor of leading the Insurance Institute for Business and Home Safety.

We know that severe weather disrupts lives, displaces families, and drives financial loss. The forces of Mother Nature will not be constrained, yet much of the damage that is caused by these severe weather events is avoidable. If the devastating hurricanes, wildfires, and other disasters of 2017 made the case for resilience, those of 2018 underscore the urgency of our mission. These experiences focused the public's attention, and should drive climate adaptation: taking actions today to reduce losses tomorrow.

Given the important societal and economic benefits, adaptation is a sound fiscal strategy, public health objective, and humanitarian obligation. From a Ways and Means Committee perspective, adaptation is likely to result in significant long-term savings, including reduced public-sector response and recovery cost after disasters.

So I think about this through at least a couple of lenses.

First, how do we prevent avoidable losses, preventing the avoidable portion of the damages that disasters wreak on homes and communities? Simply, we need to narrow the path of damage.

For example, the zone of the strongest winds of a cat 4 hurricane will cause destruction, without question. Yet the damage that can occur at the 100 and 110, and 120-mile-an-hour wind bands can be significantly reduced.

To that end we spend a lot of time talking about roofs. When you think about a home, having a roof over your head is the most basic level of need. When that roof fails because of severe weather, they can kickstart a cascade of failures. Water infiltration, projectile damage, destruction of rooftop equipment results in as much as 70 to 90 percent of insured catastrophic losses, not to mention the human consequence resulting from roof damage. When that fails we see damages in homes, we see disruption in businesses. It breaks up families, derails careers, and destroys financial security.

Our research has identified adaptation measures that can help leverage federal, state, and local resources directed towards adaptation. At a state and local level it begins with the building code. And I am going to focus today on the federal side, because there has been a fundamental shift in the way that the government prepares communities for future storm events.

Last year Congress enacted two pieces of legislation that will reduce the severity of disasters and the amount of taxpayer funds directed towards recovery. Chief among them is the Disaster Recovery Reform Act that sets aside six percent of the total spent on disaster recovery from the prior year into pre-disaster resilience projects across the country. The Disaster Recovery Reform Act, once fully implemented, will deliver the

largest investment by the Federal Government to buy down the risk of natural disasters prior to that devastation occurring.

While the DRA will be ably handled by the House Committee on Transportation and Infrastructure, there are significant opportunities within the purview of the Committee on Ways and Means, as well. Resilience and adaptation cannot be financed by the government alone. That is neither feasible nor responsible. We must drive individual homeowners and businesses to make their own investments to reduce the impacts of disasters.

If you want a practical and achievable agenda that sits within the main of this committee's jurisdiction, you could move forward with a homeowner's disaster resilience tax credit for making improvements on their own that buy down the risk of future disasters. This holds potential across every state in the union, whether your principal risk is wildfire, hurricane, high wind, earthquake, flooding, or severe winter weather.

Variations on the Disaster Savings and Resilient Construction Act have been introduced in the last four congresses. It provides a crucial incentive to building owners who persist in the belief that adaptation investments are unnecessary because they are assured it won't happen to them. What better path to reducing this growing risk than Americans taking specific impactful steps to their own home?

Americans are not powerless against severe weather. It is possible to reduce the damage inflicted today and in the future. We know it is practical, affordable, and it just makes plain good sense.

I appreciate the opportunity to share these thoughts with you today, and look forward to your questions.

[\[The statement of Mr. Wright follows:\]](#)

*Chairman Neal. Thank you, Mr. Wright.

Let me recognize Mr. Halstead.

STATEMENT OF TED HALSTEAD, CHAIRMAN AND CEO OF THE CLIMATE
LEADERSHIP COUNCIL

*Mr. Halstead. Thank you for this opportunity to discuss why America's leading companies and economists are calling for a bipartisan national climate solution that is pro-environment, pro-business, and pro-American worker.

I am the chairman and CEO of the Climate Leadership Council. We launched two years ago with the release of the Baker-Shultz Carbon Dividends Plan, co-authored by former Secretaries of State James Baker and George Shultz, among others senior statesmen. We believe this plan offers the most promising basis for a much-needed bipartisan climate breakthrough. We have since assembled the broadest climate coalition in U.S. history to advance a national solution.

[\[Slide\]](#)

*Mr. Halstead. As you can see from my first slide, our coalition includes 19 corporate sector leaders from a wide range of industries. It also includes top environmental NGOs and opinion leaders from across the political spectrum. This remarkably broad coalition is working together to develop the policy specifics of our plan. While they do not agree on every detail, they agree that our carbon dividends framework offers a consensus way forward that bridges partisan divides, strengthens our economy, and protects our environment.

Our plan is based in the soundest of economic principles. To highlight this we recently organized the largest and most

prominent public statement in the history of the economics profession. The Economist statement on carbon dividends was published earlier this year in the Wall Street Journal. Its original co-signatories include all four former chairs of the Federal Reserve; all eight former Republican chairs of the Council of Economic Advisers; seven former Democratic chairs of the Council of Economic Advisers; and 27 Nobel Laureate economists. It also includes over 3,500 U.S. economists.

All these economists agree that putting a direct price on the carbon content of fossil fuels is the most cost effective way to reduce emissions. The Baker-Shultz Carbon Dividends Plan is premised on this. It is based on four interdependent pillars.

First, a gradually rising and revenue-neutral carbon fee starting at \$40 per ton.

Second, returning all the money raised directly to the American people through equal quarterly dividends. A family of four would receive approximately \$2,000 a year in carbon dividends.

Third, streamlining carbon regulations that are no longer necessary under a robust and rising carbon price.

And fourth, a border carbon adjustment to protect the competitiveness of American firms, and encourage other countries to follow suit.

The reason the broadest climate coalition in U.S. history is coalescing around this four-part plan is because it addresses the legitimate concerns of all key stakeholders in the debate and it enables each to realize an important victory.

Allow me to briefly review the benefits.

[Slide]

*Mr. Halstead. Our plan is pro-environment. As my second slide shows, a carbon fee starting at \$40 per ton, as we proposed, would exceed the U.S. Paris commitment by a wide margin, and achieve far greater emissions reductions than all prior climate regulations combined.

Our plan is pro-business. Because of its environmental ambition it justifies a grand bargain that trades a robust and rising price on carbon for regulatory streamlining. This offers businesses the certainty and flexibility they need to innovate and make long-term investments in a low-carbon future.

Our plan is equitable. The vast majority of American families would receive more in carbon dividends than they pay in increased energy costs. This is a game changer, because it aligns for the first time the economic interests of American workers with climate progress.

Our plan is also revenue-neutral. A common concern is that solving climate change would be costly, requiring higher taxes and deficits. Our Baker-Shultz Carbon Dividends Plan would require neither, because it is revenue-neutral. Instead, it would finance the transition to a low-carbon economy by incentivizing individual and corporate behavior, and by leveraging the extensive resources of the private sector.

Our plan is also pro-competitiveness. To quote from the previously-mentioned statement of leading economists, our plan would "enhance the competitiveness of American firms that are

more energy efficient than their global competitors.''

Finally, our plan is popular. We recently commissioned the Luntz group to poll this plan. The full results will be released next week, but here is a preview. Our plan has majority support across all party lines, including 4-to-1 support overall, and 7-to-1 support among Republicans under the age of 40.

To conclude, just as industry and environmentalists in our coalition are working together, we urge members of this committee to work together on a bipartisan climate solution. The Council and its founding members stand ready to help in any way we can. Thank you.

[\[The statement of Mr. Halstead follows:\]](#)

*Chairman Neal. I thank the gentleman.

Mr. Powell, would you proceed?

STATEMENT OF RICHARD J. POWELL, EXECUTIVE DIRECTOR, CLEARPATH

*Mr. Powell. Good morning, Chairman Neal, Republican Leader Brady, and members of the committee. I lead ClearPath. We develop and advance conservative policies that accelerate clean energy innovation. An important note: we are an independent organization that does not receive funding from industry or others with a vested interest in our policy positions. Thank you for this opportunity at this important hearing.

Climate change is an urgent challenge that merits significant action at every level of government and the private sector. Its economic and health impacts are clearly rising. For example, the National Oceanic and Atmospheric Administration finds that the five-year running average of damage of weather events has risen fivefold over the past 20 years, from \$20 billion a year to \$100 billion per year.

As this committee considers its part in U.S. climate policies, your solutions should be ambitious, technology inclusive, politically realistic, and substantively pragmatic. Too often climate policy is oversimplified to false choices -- renewables versus fossils; economy versus environment; immediate reductions at home versus inaction. The reality is this: solutions must make the clean energy transition cheaper and faster, while preserving economic growth and reflecting the global nature of this challenge.

For example, the expected emissions growth by 2050 from developing Asian countries alone would offset a complete

decarbonization of the U.S. economy by mid-century. In addition to all of China's domestic coal, their Belt and Road Initiative is building 100 gigawatts of coal plants without carbon controls in 23 countries like Vietnam and Indonesia.

We have a choice: bet that China and their partners shut down their coal at the cost of growth, or develop, demonstrate, and deploy affordable carbon capture technologies abroad.

We need an aggressive innovation policy to make clean energy cheap. In the near term, politically unrealistic policies to make traditional energy more expensive will only aid deployment of existing technologies, not facilitate breakthroughs relevant for the developing world.

Effective policies to make clean energy cheaper include both pushes and pulls. They invest in basic and applied R&D, demonstrate technologies in public-private partnerships, and accelerate early deployment. This early deployment enables the all-important learning by doing, which has driven the huge cost declines in natural gas, wind, and solar. Federal tax incentives have effectively deployed numerous clean technologies, such as the unconventional gas credit that scaled up shale gas in its early days.

As you all know well, these policies enjoy bipartisan appeal. In just the past two congresses Chairman Neal, Congressman Reed, and many others on this committee championed the solar ITC and PTC extension and phase-down deal. Representatives Conaway, McKinley, Sewell, and Boyle were instrumental in the 45Q reform package for carbon capture from

power plants and industry. And Representative Rice's 45J reform bill, supported by Representatives Blumenauer, Marchant, Sewell, Ferguson, and Schweikert will facilitate the first advanced nuclear reactors.

Moving forward, the climate challenge calls for new policy designs. Today's technology-specific approaches virtually all phase out over the next eight years. Those incentives have become ill-suited to stimulating the breakthrough innovation we need. This committee should take advantage of the bipartisan consensus around deploying new technologies.

For example, Representatives Reed and LaHood have proposed the Energy Sector Innovation Credit, or ESIC. This technology-neutral approach would leverage market signals, helped the most promising technologies, and phase down as each technology proves its commercial availability. ESIC limits market distortions, unlike existing production tax credits. Its qualification criteria requires step change performance across all generation sources. It does not pick winners and losers.

A recent report sponsored by Bill Gates's Breakthrough Energy Coalition, and authored by Daniel Yergin's IHS Markit and former Energy Secretary Ernie Moniz's Energy Futures Initiative, highlights federal tax policy as a key enabler for clean innovation. Moniz and Yergin specifically recognized the Reed-LaHood ESIC concept.

Some preliminary analysis conducted by premier energy economic modellers on location projects the Reed-LaHood proposal to result in gigaton-scale CO2 emissions reductions by 2040, just

with contributions from a group of known clean technologies near to demonstration: small modular reactors like NuScale, innovative carbon capture technologies like NetPower, floating offshore wind and energy storage.

ESIC will surely cut emissions far more by scaling up all the technologies we cannot even foresee today.

Many other innovative financing ideas warrant consideration. Bipartisan members support legislation to establish clean technology bonds, expand eligibility for master limited partnerships, and even leverage private activity bonds for innovative projects. We must now together decipher what suite of policies yield the greatest bang for the buck in reducing global emissions.

A serious debate on climate solutions must include a dose of political and technical realism. I am here to tell you firsthand that it is all right to be conservative and agree climate change is an urgent problem to address today, not tomorrow.

ClearPath is eager to assist the committee in advancing stronger policies that commercialize cutting-edge clean technologies needed to reduce global emissions as quickly and cheaply as possible.

Thank you again for the opportunity.

[\[The statement of Mr. Powell follows:\]](#)

*Chairman Neal. I thank the gentleman. Before we proceed to the questioning phase of this hearing I want to recognize Ranking Member Brady for a brief opening statement. And without objection, his statement will be included in its entirety in the record.

Mr. Brady?

*Mr. Brady. Chairman, thank you for calling this hearing. Changes in the earth's climate system are a real cause for concern, and reducing global greenhouse gas emissions is a shared priority.

As Republicans we are hopeful that today can be an opportunity to focus on bipartisan attainable solutions and finding them. We believe the key to successfully tackling climate change is American innovation. Innovation is what made America the global energy leader. And what will make us the driving force behind clean and affordable energy is a realistic, practical solution to greenhouse gas emissions.

Our goal is to find ways to make clean energy more affordable, not drive up traditional energy costs for working families and Main Street businesses. As we know from experience, like with the failed stimulus, simply throwing billions of dollars from D.C. toward federal programs and hoping it will stick somewhere is just not going to solve this big challenge.

We must instead incentivize affordable clean energy and make smart investments in cutting-edge technologies. Because consumers want clean energy, and the market is reacting well to that without government interference, let's build on that

momentum. But the way to do so is not through increased taxes and overly burdensome regulations. We need instead to make it easier for our job creators to speed up innovation for cleaner and cheaper energy technologies. With our economy continuing to soar following the GOP tax cuts, we must ensure America maintains its competitive edge as we work to combat climate change.

Let's use this growing economy as the key to unlocking the door to even more innovative market solutions. We are seeing that innovation in my home state of Texas, where in the Permian Basin, which is producing more oil than any other basin on Earth, methane emissions per unit of oil and gas produced has plunged by 57 percent, even as production of affordable energy has soared. And CO2 emissions are at the lowest levels in two decades.

As a country, compared to China and other signatories of the Paris Agreement, we have seen a remarkable reduction in greenhouse gas emissions. The world does need a leader in discovering new clean energy technology. And whatever country wins that race will greatly benefit because of it, as will people around the world. That innovation leader needs to be the United States.

We believe a carbon tax is not the solution to address our environmental challenges. Other countries that have implemented the carbon tax impact on global emissions have been negligible. Many have simply exported their pollution to places like Russia. So, instead of raising taxes on working families in America who can least afford it, the answer to decreasing emissions is found by empowering American innovators to create global clean energy

solutions.

If we want to export clean energy technologies to every corner of the globe to reduce greenhouse gases, we must remove foreign barriers to American innovators. Republicans have long supported the Environmental Goods Agreement negotiations at the World Trade Association -- Organization, which would levy zero tariffs on environmental technologies and services sold around the world. It is time to get that agreement done. Republicans called on President Obama to make that a priority, and we call on President Trump's Administration to do the same.

As with anything of value, Congress needs to decide if this is a political issue with no solution in sight, or a vital policy issue that both parties can work together to find common ground. We choose common ground.

Regrettably, today the leading Democrat plan in Congress to combat climate change is the so-called Green New Deal, which many of our Democrat friends have enthusiastically embraced. That plan, in our belief, is Socialist policy simply masquerading as green. It is outlandish. It is unrealistic. Frankly, it is unhelpful. At its core the Green New Deal would just export American manufacturing jobs to other countries, where manufacturing is dirtier and emissions are growing, while at the same time killing American jobs.

So, instead of advocating for these unrealistic policies, let's find bipartisan solutions together that support American innovation, lower energy costs, and drive our economy.

Thank you, Mr. Chairman.

[The statement of Mr. Brady follows:]

*Chairman Neal. Thank you, Mr. Brady.

Dr. Marvel, we know that climate change is real, and we know that we are heating up the planet, although measurement variables can complicate precise forecasts of temperatures in the future. Is there any credible climate change forecast that allows us more time to consider the role of human activity before taking significant action to reduce carbon emissions?

*Ms. Marvel. No. To limit global warming to well under two degrees Celsius, which is the Paris commitment, all credible scenarios, every single one, require rapid decarbonization.

There is still uncertainty about how much time we have before exceeding the carbon budget to remain under 1.5 degrees Celsius. But we need to act as soon as possible.

*Chairman Neal. Can you briefly discuss the range of likely outcomes if we continue along the current path?

*Ms. Marvel. Sure. The impacts that I discussed in my opening statement, everything from droughts, to heavy downpours, to increase hurricanes, all of these things increase as the temperature increases. There is uncertainty about how much temperature increase we will expect in the future, but the main source of that uncertainty is what humans will do.

*Chairman Neal. Thank you. Dr. Jha, could you speak to how the Massachusetts health care community is preparing for health care needs related to climate change now and in the future?

*Mr. Jha. Absolutely, Congressman. So it has been very clear to us in the Massachusetts health care community that climate change is real, it is happening, and it is affecting our

communities today. And so we have seen leadership from cities across Massachusetts -- Boston, Worcester, Springfield -- where cities have brought together health care leaders in their communities to do a series of things.

One is to start building more resilient health care delivery systems, building the resilience of hospitals that are going to be facing storms, getting hospitals to commit to reducing their own greenhouse gases. Recently all of the Harvard teaching hospitals made a very public commitment to substantially reduce their greenhouse gas emissions. That, I think, has been a critical part.

And there have been a series of other activities to try to get the energy sources that the hospitals rely on to be less focused on carbon and more on alternative energy.

So the healthcare industry, certainly in Massachusetts, Congressman, that you know well and -- but really, across the country we are seeing pockets of innovation where health care providers are recognizing that this is a really problematic health issue, and that we have got to take leadership on this.

*Chairman Neal. Thank you. And Mr. Wright, what barriers do you see that prevent stakeholders from adequately measuring and managing climate risk?

And what steps do you think we can take to incentivize businesses and governments to adopt new and existing infrastructure to address climate change?

*Mr. Wright. Absolutely. As others have looked at the kind of more global elements of it, I want to focus on those specific

actions that businesses and homeowners can take.

The biggest barrier is this psychological effect that says it won't happen to me. Yet we keep watching the impact of these disasters ravage communities over and over -- across America. And so, first thing is make sure that people understand what can happen to them. Just because it hasn't flooded doesn't mean that it won't. Where it rains, it can flood. We look at the wildfire pieces and the like.

The related piece is then, if the Federal Government is already making investments on these broader-scale elements related to pre-disaster mitigation, how do we get individual homeowners and small businesses to lean forward and make those investments themselves? The steps are affordable and achievable. What we need to do is incentivize them to move farther down that road, whether that is through tax credits or other kinds of means by which they are willing to make those investments themselves.

*Chairman Neal. Thank you.

And Mr. Halstead, in your testimony you state that "An optimal climate policy would benefit many American businesses, and a climate solution would level the international playing field.'" How would a national climate policy and stable regulatory environment help American businesses compete internationally?

*Mr. Halstead. Thank you. What American businesses want is a climate solution that is pro-environment and pro-business. What is most important to businesses in this are four things: one, regulatory certainty; second of all, the flexibility to

reach climate goals in the most cost effective manner; third of all, a pro-competitiveness climate solution; and fourth, to speak to Ranking Member Brady's comments, they want clear incentives for innovation.

And the reason that so many American businesses are pushing for a national carbon price is because it offers a far more cost-effective solution than regulation. And our program, the Baker-Shultz Carbon Dividends Plan, is based on a grand bipartisan bargain: trading a high price on carbon for regulatory certainty. That is a trade in which the environment wins and businesses win.

*Chairman Neal. I thank the gentleman. With that let me recognize Mr. Brady, the ranking member, to inquire.

*Mr. Brady. Thank you, Mr. Chairman. With your permission we will start the questioning with Mr. Buchanan.

*Chairman Neal. So ordered.

*Mr. Buchanan. Thank you, Mr. Chairman. I want to also thank all of our witnesses for taking the time. I want to thank you for holding this important hearing today. As you may know, my community in southwest Florida is one of the longest shorelines. And if we look at any of the congressional districts, it might be the longest shoreline when you take in the bays and everything else.

But it is also the most at risk for climate change, with some estimates ranking Manatee County, which is just south of Tampa, one of the three counties in my districts as the most -- single most at-risk county in the entire country. In fact, one

estimate found that the city of Bradenton, which is in Manatee County, could suffer more than \$25 billion in home loss due to climate change.

With this in mind, Mr. Powell, how can we spur innovation in clean energy technology to address this very serious issue? So they are saying that Manatee County in my region is one of the most at-risk counties. And of course, you look at all of Florida and the peninsula, we are surrounded by a lot of water. But I wanted to get your thoughts on that.

*Mr. Powell. Well, of course, sea level rise is one of the major problems associated with climate change, and the rise in global temperatures, and the melting of ice around the world.

The way to address sea level rise, of course, in the short term is through adaptation policy, which creates seawalls and hardens infrastructure in threatened communities like yours. And in the longer term it is finding ways to reduce global CO2 emissions. The way we reduce global CO2 emissions is by creating very affordable, high-performing zero-emission technologies that we can sell to the rapidly developing world to help them reduce their emissions right alongside our emissions reductions --

*Mr. Buchanan. Let me also ask you the former -- Mr. Powell, the former Defense Secretary, James Mattis, and the Pentagon have stated that climate change is a national security issue that requires a broader, whole-of-government response. That is the quote.

Can you explain how this presents a national security challenge, in your mind?

*Mr. Powell. Absolutely. The clearest challenges are to our bases and naval facilities here in the United States. They are already seeing, in some cases, hundreds of millions of dollars of damage in individual years due to climate-related impacts.

*Mr. Buchanan. And, Mr. Halstead, do you think it is possible to address climate change without impacting the economy? Or are these two mutually exclusive?

*Mr. Halstead. I believe -- thank you for the question -- I believe they are entirely compatible.

One of the blocks to climate progress over the last 20 years is that the American people want to move forward on climate policy, but they are worried that it could hurt the economy or their pocketbooks. We have offered a plan that would have zero increase in the size of government, and under which the vast majority of American families would come out economically ahead by receiving a dividend of \$2,000 per year. That is the reason why so many businesses support our plan, because it is both pro-growth, pro-jobs, and pro-environment.

*Mr. Buchanan. Thank you. And with that I yield back.

*Chairman Neal. Let me recognize the gentleman from Georgia, Mr. Lewis, to inquire.

*Mr. Lewis. Thank you very much, Mr. Chairman, for holding today's hearing.

Climate change is one of the most urgent matters of our generation. Twenty seven years ago I was proud to champion the Environmental Justice Act with then-Senator Al Gore. I believed

then what I know to be true today: clean air, clean water are a right and not a privilege. We have a right to know what is in the food we eat, what is in the water we drink, and what is in the air we breathe.

Each and every one of us must cherish this planet, for it is likely the only home we will ever know.

Combating climate change is not a Democratic or Republican issue. It is the question of preserving this little piece of real estate that we call Earth for a generation yet unborn.

Together we can solve this problem. But time is of the essence. Congress cannot stand on the sidelines. We have a moral responsibility to lead, and the time to act is now.

Mr. Chairman, I ask unanimous consent to submit a report conducted by the NAACP Clean Air Task Force and the National Medical Association on the health impacts of pollution on African-American communities.

*Chairman Neal. So ordered.

[\[The information follows:\]](#)

*Mr. Lewis. Thank you.

Mr. Halstead, I have a simple question. The impacts of climate change costs taxpayers billions and billions of dollars. Do you have ideas on how to change the tax code might help us combat climate change and support those on the front line of the environmental justice movement (sic)?

*Mr. Halstead. Thank you, Mr. Lewis. Economists agree that the more you price something, the less of it you get. We all want fewer carbon emissions. The tax code is actually the most cost-effective way to solve the climate problem.

I also want to make clear that I am a climate conservative. What makes me a climate conservative is that I believe that a market-based solution is more effective than a regulatory solution. All economists would agree on that. However, it is possible to do this in a way that is highly equitable.

Our plan would make 70 percent of American families economically better off, including the most vulnerable Americans. It would also achieve far higher emissions reductions than any past climate regulation combined. So, in short, yes, the tax code can help in solving the climate problem by substituting a high price on carbon for regulations.

*Mr. Lewis. Thank you. Dr. Jha, I also have a question for you. What may Congress do to curb the negative health outcomes of climate change on minority and poor communities?

*Mr. Jha. Congressman, thank you for that question. As you know, poor and minority communities in America disproportionately suffer from poor environmental conditions. The report that you

mentioned found that African-Americans in this country breathe air that is 40 percent more polluted than non-African-Americans. So fundamentally, climate change and burning of fossil fuels is not just a general health issue, but it is a health issue that disproportionately affects poor communities and communities of color across the country.

So the first thing we need to do is enable a transition away from dirty fuels that cause these emissions. So we have been talking a lot about about climate change and carbon as a way to increase -- as a way -- increase temperatures on the planet. But burning of fossil fuels has all sorts of other byproducts. And so what we see in communities, especially communities of color, is where you have more traffic, more diesel, more of these environmental pollutants, you see more effects on kids with asthma, you see more effects on elderly people admitting -- getting admitted for respiratory and cardiovascular conditions.

And so the first order of business is to try to get our economy off of burning fossil fuels and towards clean energy. That will have a beneficial effect for all Americans. But I think it will have a disproportionate effect for communities of color.

*Mr. Lewis. Thank you. Mr. Chairman, I yield back.

*Chairman Neal. I thank the gentleman. Let me recognize the gentleman from Nebraska Mr. Smith to inquire.

*Mr. Smith of Nebraska. Thank you, Mr. Chairman. Thank you to our witnesses, as well, for being here today.

While we are taking this time to review the climate

challenges facing us, I think we should also take a look back at tax policies which the very users tell us have been successful.

For example, after the end of this year new wind power projects will not be eligible for the wind production tax credit. Why? Because the wind power industry came to us with data which showed they no longer needed the credit for their energy to be cost competitive with other sources of electricity, and worked on a bipartisan path to winding down their credit.

Similarly, solar supporters worked on a bipartisan basis to find a long-term solution which phases out the residential solar credit and reduces a commercial credit to 10 percent after 2023.

Based on this work the message of these industries during tax reform was simple. They had already been reformed, and they wanted to leave that agreement in place, and we won't need to come back to extend or enhance these provisions in the future. I am actually disappointed we haven't yet been able to enact similar legislation for the biodiesel tax credit, which stakeholders across the industry, from soybean growers and renderers, to refiners, to blenders, and users brought us to last year.

With the -- with all three of these provisions -- wind, solar, and biodiesel -- the goal has been to make them more price competitive, as opposed to making competing fuels more expensive.

Mr. Powell, do you believe that the best strategy for cutting carbon emissions is to actually increase the cost of traditional carbon-emitting energy?

*Mr. Powell. Thank you, Mr. Smith. I do not.

The point here is to develop cheap, clean energy technologies that the developing world will adopt on their own, and reduce global carbon emissions. The developing world is extremely unlikely to adopt policies that make their traditional energy more expensive. They need technology options that are cheaper than the alternatives.

We have already made a huge amount of progress in bringing down the cost with -- of wind and solar, as you describe. Now we need a much broader suite of very low-cost, high-performing clean energy technologies that the developing world will take up purely on their economic merits.

*Mr. Smith of Nebraska. So affordability increases access?

*Mr. Powell. Absolutely.

*Mr. Smith of Nebraska. Certainly that does make sense to me.

But I do want to emphasize the fact that I appreciate various stakeholders in tax policy working together with us to bring about longer-term policy, you know, with some phase-downs because of lack of necessity moving forward. And so I appreciate the work that has been done, and I think can point to some progress that we have made in terms of being good stewards of our environment.

So with that, Mr. Chairman, I yield back.

*Chairman Neal. I thank the gentleman. Let me recognize the gentleman from Texas, Mr. Doggett, to inquire.

*Mr. Doggett. Thank you, Mr. Chairman. The testimony you provided today is powerful, and I am pleased to see unanimity,

perhaps not on every action we should take, but on the urgency that we take action. Knowing that every month that this Congress fails to act, every year that this President rolls back the few regulations that might lead us in the right direction on this makes the solutions much more difficult and the dangers much greater.

The science is certainly clear. We are already seeing the deadly consequences of climate change harm millions of people around the globe today.

What is going up is global temperatures, hot and hotter, along with severe and erratic weather. And we saw the consequences in what many consider the energy capital of America, Houston, when five feet of water came down in a very short period of time. In other areas droughts, wildfires, disease. I know that during my grandchildren's time here on this planet that Texas will look much more like the Permian Basin, barren on the surface, and that coastal areas will suffer severe flooding. In fact, we have estimates that within the next 15 years the Bolivar Peninsula will be flooded every other week because of climate change.

What is going down, unfortunately, is the President's recognition of sound science and a commitment to doing anything about what you have described today. The only thing green in this Administration is the color of the dark money that is polluting our democracy and preventing action now. They are really running backwards.

In this Administration a recent report indicates that there

have been 71 rules that have been adopted that are on the big business deregulatory plan that are directly contrary to what you have testified about today, agencies that include the Environmental Protection Agency, the Department of the Interior, mostly with their top priority being how can we get more use of dirty coal to fuel our energy in this country, when dirty fuel, dirty coal has largely been displaced, not by any environmental regulation, but by a much cleaner natural gas.

Christmas has really come early in this Administration for the fossil fuel industry. But the rest of America gets their stocking stuffed with coal. What -- only yesterday in Louisiana President Trump was celebrating what he called his energy revolution. In my opinion it is not revolutionary, though it is a bit revolting.

And in this committee, as has been indicated, no climate action considered for 12 years. And it has been about a decade since we considered any serious broadening of comprehensive clean energy legislation. Instead, what we saw last year was the adoption of a new tax law to give even another tax break to big, multinational oil companies. For the first time they get a get-out-of-taxes-free card on some of their offshore profits.

It will be increasingly difficult for us to do something now that is politically painful, where the results will not be fully realized for years to come. But we are called upon by your testimony to do it, and to begin to change our overdependence on fossil fuels and, more importantly, on fossilized thinking.

I want, as the subcommittee chair for the Health

Subcommittee, Dr. Jha, particularly to focus in on the health issues, and ask you what contribution is being made by those within the health industry, generally, and what do we need to do to encourage more to occur there.

*Mr. Jha. Thank you for your question, Congressman. The health care industry, as I mentioned earlier, represents about 10 percent of all greenhouse gases. That is a pretty substantial footprint. There are examples of -- Kaiser Permanente, for instance, has said it will be carbon neutral by 2020, next year. And there are others -- the -- sorry, I am blanking on the name of the system in Wisconsin that has been off of fossil fuels --

*Mr. Kind. That would be Gundersen Lutheran.

*Mr. Jha. Gundersen, thank you.

*Mr. Kind. My hometown.

*Mr. Jha. Thank you. I am sorry, Congressman. Gundersen was right at the tip of the tongue, there. But yes. No, and Gundersen has been a real leader in this for quite a few years.

So the point is there are real points of light in the health care industry, but too many hospitals and nursing homes are just not quite doing enough.

Under the Obama Administration HHS and then CMA specifically had put in regulations for hospitals to become more resilient to withstand storms. I think that was useful. But in terms of health care leadership, we have seen it from physicians and nurses, but we have not seen it enough from hospitals and other institutions. And I think it is an opportunity for the health care industry to lead.

*Mr. Doggett. And the pharmaceutical industry?

*Mr. Jha. I think the pharmaceutical industry -- the best evidence is that, you know, the production of pharmaceuticals is very energy intensive. And I have seen very little evidence that the pharmaceutical industry has taken that on seriously and made reducing its carbon footprint a priority. And I think it ought to.

*Mr. Doggett. Thank you.

*Chairman Neal. I thank the gentleman. Let me recognize the gentleman from Texas, Mr. Marchant, to inquire.

*Mr. Marchant. Thank you, Mr. Chairman.

Mr. Powell, you said in your testimony that, historically, policies developed by this committee have been extremely effective in deploying new technologies. The committee should focus on this area of bipartisan consensus as an opportunity for meaningful near-term clean energy solutions. I agree with that. I have worked with my colleagues on both sides of the aisle on bills and policies that have promoted clean -- nuclear energy, specifically. And I hope that it will lead to even newer and better technologies.

Mr. Halstead, my district is a district that has several large energy-producing companies: Exxon Mobile, Pioneer, and hundreds of other extraction processing refinery companies. I also have 800,000 people that coexist in that business climate.

Can you, with some more detail, describe to me the mechanics of how one will be affected and the other will be affected? So -- I mean is the bill in any kind of a bill form yet, the Baker-

Shultz carbon dividend tax? Is it in bill form yet?

*Mr. Halstead. It is not in bill form. We look forward to working with the members of this committee in turning into a bipartisan --

*Mr. Marchant. So it is not in bill form, so there is nothing I can go look at to talk about. Can you talk about the mechanics of how one company will have to do this, and then it will be sent, supposedly, to -- is it a family or a individual unit?

*Mr. Halstead. Yes, yes. So we would put in place a carbon fee of 40 -- starting at \$40 per ton.

*Mr. Marchant. Okay, convert that to a gallon of gasoline. How much will that raise the price of a gallon of gasoline?

*Mr. Halstead. A gallon of gasoline would go up approximately \$.36 per gallon. But here is the key point. The vast majority of American families, 223 million Americans, would come out ahead under this plan.

*Mr. Marchant. Okay, okay, I got it. Just mechanically, just to -- so everybody can understand, you would -- the companies would pay a \$40 tax, or carbon tax. That money goes where?

*Mr. Halstead. That money goes straight back to the American people, who will get a quarterly --

*Mr. Marchant. No, no, no. There has got to be some kind of a middle person in there. Who will be the middle person that collects that carbon tax?

*Mr. Halstead. The Federal Government.

*Mr. Marchant. Okay, then the Federal Government, they have got an existing agency that would handle that?

*Mr. Halstead. Most likely the Social Security Administration, because it is trusted by the American people. And I would --

*Mr. Marchant. So the Security Administration will be in the business of collecting a carbon tax. And then they will take the money in, and then approximately how many checks will be cut each month out of that back to the individual families? Or -- is it per person, or per family?

*Mr. Halstead. So it is more likely to be the Treasury Department that would administer the fee, and the Social Security Administration that would rebate it to the American people.

Every American family would receive a quarterly check. And I would present to the committee that there is a clear successful model for this in Alaska. In the 1970s a Republican governor in a Republican state passed the Alaska Permanent Fund. It is still alive to this day --

*Mr. Marchant. The Alaska funds come from minerals that are extracted out of the ground. They --

*Mr. Halstead. Correct. It proves the popularity and feasibility of the --

*Mr. Marchant. How many checks -- how would you -- how do you -- in this program, how do you define a family? Is it a single person? Does a single person get the same amount of money as a family of six?

*Mr. Halstead. Every American adult would get the same

amount of money. Every child would get half as much. So if you are an individual, you would get a direct payment. If you are a family of four or five, you would get a direct payment.

*Mr. Marchant. Approximately how many checks do you -- have you -- do you see that -- being created per quarter?

*Mr. Halstead. Well, I don't think it would be checks. It would more likely be direct deposits or direct payments, for example, to your --

*Mr. Marchant. Yes, it --

*Mr. Halstead. -- to your cell phone.

*Mr. Marchant. How many direct deposits, how many transactions will the Treasury end up making per quarter on that?

*Mr. Halstead. So you take the total number of Americans and you give to them every quarter.

*Mr. Marchant. How many transactions do you forecast that to be?

*Mr. Halstead. About somewhere in the neighborhood -- first of all, I would rather get back to your committee on that, but there are about --

*Mr. Marchant. I am sure you have thought through this a little bit more than that.

*Mr. Halstead. We have thought it through. Let me get you a paper on that. I cannot tell you the exact number of checks that would be cut on a quarterly basis --

*Mr. Marchant. It would be 60 or 70 million checks every quarter.

*Mr. Halstead. That sounds about right.

*Mr. Marchant. Okay, thank you.

*Chairman Neal. I thank the gentleman. Let me call on the gentleman from California, Mr. Thompson, to inquire.

*Mr. Thompson. Thank you, Mr. Chairman. And thank you for holding this hearing. I know it has been 12 long years. It has been long in coming, but I am glad we are doing it today. And I want to thank all the witnesses for being here today.

This is an interesting phenomenon that we are witnessing in this committee today. You know, when there is a problem the first thing you have to do is everybody has got to agree that there is a problem. And that is not always how it happens in Congress. And this is the first time, I think, since I have been on this committee that we have had all of the witnesses, both Democratic witnesses and Republican witnesses, here in agreement that climate change is real, and climate change is a problem. So there may be some of our colleagues who aren't there yet, but the fact that you are here and all in agreement that it is a problem and we need to do something, I think is a very important step forward.

I know that climate change is real, and I know the consequences of climate change aren't hypothetical. It -- my state of California, and my district in particular, has been just devastated by fires over the course of the last four years: the Mendocino Complex Fire, 459,000 acres, \$267 million dollars in damages; the Carr Fire in Shasta County, right outside of my district, 1,000 homes lost, 1.6 billion in damages; the Thomas Fire, 280,000 acres, \$2.2 billion in damages; the Tubbs and Atlas

Fires in my district. Sadly, 44 people died in that fire. And, Mr. Wright, I know you are familiar with this, because your family lost homes in Paradise in the Camp Fire, \$16.5 billion dollars. And worse yet, over 85 people dead, and I understand some still missing.

It appears that these fires may be the new norm. And we do need to take action, and need to take action quickly.

Dr. Jha, you talked about the medical impact of climate change. There is also a medical impact of these fire disasters, as well: smoke inhalation, allergy exacerbation, the trauma that is caused by this, and the PTSD. There are kids in my district that, if the fire siren goes off, they absolutely melt down. And there are adults that are in that situation, as well. Those are costs that we need to somehow figure out how to deal with. And the fact that every time there is a fire we either lose a hospital in that fire, or hospitals are shut down and patients have to be evacuated sometimes multiple times during a fire.

Can you talk a little bit about the total cost package to health care?

*Mr. Jha. Yes. So, Congressman, it is a fabulous question. And let me make a broader point about what wildfires, what Hurricane Maria, what all of these storms have taught us, and these events, weather events, have taught us, which is while there is a direct effect right away, and we see it in the number of people who lose their lives in the fires, the big health consequences and economic consequences from those health effects come in the days and weeks and months that follow.

What we know from the wildfires -- to speak specifically to your issue -- is that you get a substantial increase in respiratory diseases, asthma, COPD. You see more emergency department visits, more hospitalizations for heart attacks, strokes, heart failure. These things are incredibly costly to people, in terms of their health. It is incredibly costly to the health care system, to Medicare, to Medicaid, and private insurance, and businesses that pay for all of that.

The disruption that comes from hospitals burning down -- but, you know, hospitals are no good if the doctors and nurses to staff them aren't there. And they get displaced. And when people get displaced -- for those of us who are healthy it may not be a big deal to be displaced for a short period time. But for people who are chronically ill, it is a huge effect.

*Mr. Thompson. Thank you. Thank you very much. I believe this is at the point where we need to be big and bold in what we do. But at the same time, I think we need to take some incremental steps, and I think we can do both at the same time.

So Mr. Halstead and Mr. Wright, I have been very active and incremental of efforts to use the tax code, to green the tax code. Congressman Reed and I have a couple of measures. Do you agree that we need to be doing both?

*Mr. Halstead. Yes, I think we both agree that we need to do both.

Maybe you could talk about the --

*Mr. Thompson. Just a --

*Mr. Halstead. Well, I won't talk about the --

*Mr. Thompson. Just a yes, because we are out of time.

*Mr. Halstead. Yes.

*Mr. Wright. Absolutely.

*Mr. Thompson. Or a no. So you are both yeses?

*Mr. Halstead. Yes.

*Mr. Thompson. All right. Thank you very much. I yield back.

*Chairman Neal. I thank the gentleman. With that, let me recognize the gentleman from New York, Mr. Reed, to inquire.

*Mr. Reed. Thank you, Mr. Chairman, and thank you to our panelists.

And I am here today as a proud Republican, and a proud Republican that recognizes that the issue of climate change needs to be addressed. And rather than engage in causes and things like that, I am about solving the problem. And one of the things, as you have noted, Mr. Powell, in your testimony, and as Mr. Thompson noted in his questioning, is that we are trying to use the tax code.

I am a proud Republican that is trying to promote tax policy that is going to unleash the power of Americans' innovation, the entrepreneurial spirit of Americans that are going to change the marketplace in the area of energy technology.

You noted our proposed tax credit legislation, and the heart of that is, I think, symbolic of a different approach that maybe some of my colleagues on the other side of the aisle versus our side of the aisle want to approach.

You know, you can mandate emission relief. The government,

U.S. Government, can put a mandate out there and say, "We are going to do this.'" But if you don't have the technology in order to achieve that, isn't that just a paper tiger? Don't we need to have the technology readily available, not only to America, but to all of the world, with America leading, that would allow those reductions to exist? Is there any fault in that logic that I am trying to put forward here, Mr. Powell, that you see?

*Mr. Powell. I find no fault in that logic, Mr. Reed, and thank you very much for your leadership on this issue, in introducing the ESIC proposal.

I do think this proposal, both by focusing on innovative technologies -- so not technologies that are already out there, and demonstrated and deployed, but new technologies that meet really impressive performance benchmarks against what they would be replacing -- and technologies that can best work with markets, as opposed to against them.

So your proposal to pay out the credit as a share of what technologies earn in the market, as opposed to how much power they produce, means that we would be directing resources to the kinds of technologies the market values most. And that strikes me as the sort of thing that will direct our government resources towards the most promising technologies, which hopefully then could be adopted around the world.

*Mr. Reed. And see, that is the point. As I researched this issue, and I spent time in this space -- because I think we all agree we want to improve the climate, we want to make sure

our kids and our grandkids have a safe earth in order to enjoy their lives.

And when I look around the world, and I see existing technologies, antiquated technology, but because they are cheaper, those third-world countries are deploying coal plants, they are deploying other technologies without emission controls because they can't afford anything else, am I missing something in that review, that research, that says, you know what, if we gave the new energy technology to that third-world country, or a country like India or China, where, based on market, they would be driven to make a decision that says, you know what, I am not going to expend that cost on that old technology, that polluting technology, I am going to adapt that innovative new technology, won't that move the needle quicker and faster and bigger in regards to controlling emissions? Does anybody disagree with my analysis of that situation? Mr. Powell?

*Mr. Powell. I do not. If you just look at the energy -- the International Energy Agency and their data about the global use of energy, over the past decade, if you look at the share of energy that is coming from clean or zero-emission resources, that hasn't increased. It stayed steady at 22 percent around the world over the past decade, despite everything we have attempted to do with forging international consensus on climate change. It means that, with existing technology, we are just keeping pace, we are treading water, we are not accelerating the transition.

*Mr. Reed. And so, the -- wrapping up here -- and again, as a proud Republican, I think unleashing the power of the market

across the world, empowering individuals and those innovators to come up with that technology should be our top priority. I can continue to work with government standards, government type of reasonable goals, and things like that. And I think there is an opportunity to bring that into the policy mix. But I think, in my humble opinion, if we are going to take on this issue we need to lead the world by our innovation and our entrepreneurial spirit, because then we change the marketplace around the world, and that unites the world because of their own interests being aligned with our interests at that point time to not only solve the climate issue, but adopt that new energy technology that is going to really move the needle to address this problem, in my opinion.

With that I yield back.

*Chairman Neal. I thank the gentlemen. Let me recognize the gentleman from Connecticut, Mr. Larson, to inquire.

*Mr. Larson. Thank you, Mr. Chairman, and thank you for conducting this hearing. I would, Mr. Chairman, like to submit for the record the number of carbon tax supporters, including Mr. Baker and Mr. Shultz, Mr. Paulsen, Mr. Cohen, Mr. Tillerson, Mr. Laffer, et cetera, because I think it is --

*Chairman Neal. So ordered.

[\[The information follows:\]](#)

*Mr. Larson. It is vitally important.

I want to join in the questioning that my colleagues have, because I think they are on to something here. But I want to start by asking Mr. Halstead how successful would a climate change tax be in reducing emissions in the United States, when compared to commitments agreed to under the Paris climate agreement.

*Mr. Halstead. The proposal that we have for a carbon fee of \$40 per ton rising every year would far exceed the U.S. Paris commitment. Our data shows that by 2025 we would achieve about 32 percent greenhouse gas emissions, which is well above the Paris target of 28 percent. And recent modeling from Resources for the Future shows that by 2035 our plan could achieve between 47 and 53 percent CO2 reduction, far -- that is why economists agree that a market price is, by far, the most cost effective and ambitious climate tool.

*Mr. Larson. I would agree with that, et cetera. I noticed that you were nodding your head quite frequently as Mr. Powell was talking about innovating our way through this. It occurred to me that, in your presentation, and knowing that it is modeled after the Alaska approach, would there be a way to divert that money into innovation? Is there a way for the two of you to come together on this? Are we miles apart?

It would just seem to me that a combination of the two could achieve a couple of goals, unleashing the market forces that we need, but with a very targeted and focused stream of money that could incentivize even greater research and development, and not

relying on the spontaneity or the desire or goal of an individual company, but a coordinated effort that could be led.

Mr. Halstead?

*Mr. Halstead. Thank you for the question. You mentioned Secretary Baker previously. When he has testified about this he pointed out our plan is not a carbon tax, it is a dividend to the American people. We believe that that makes all the difference. As long as a climate policy comes across to the average American as an increase in their energy taxes, and therefore a decrease in their living standard, it is not going to be popular. The revolutionary aspect of a dividend is that it aligns the economic interests of ordinary Americans with climate progress. And we also think that it offers the best potential for bipartisan climate agreement because, of course, the two parties will want to use the money --

*Mr. Larson. I would agree that -- with its popularity. But is there not a way to take a portion and divert it? Mr. Powell, would you be open to something like that, or is it just -- you are purely for a market-based solution?

*Mr. Powell. Well, as we look at the spending required for an innovation-based policy, it is real money, we are talking about billions of dollars of federal support, but it is not enormous dollars. The preliminary modeling, for example, on the Reed-LaHood proposal shows that in some years that might require in the low tens of billions of dollars in terms of incentives to new clean energy technology.

So I don't think it would be required to create an entirely

new class of revenue-raising to fund a program like that.

*Mr. Larson. In your testimony, Ms. Marvel, you talked about the impact of climate change, especially on flooding, et cetera. I represent a district that has the Connecticut River, the longest river in the -- in New England. And we have a very complicated series of levees that were first constructed after the floods of 1936 and 1938.

In your estimation -- and it is -- in your testimony you talk about how this is only going to get worse -- what do we need to do to address these things? And how important is it to act now, before we see the collapse from something -- maybe not even over-flooding, but like what happened in the Ninth Ward in New Orleans with sand piping?

*Ms. Marvel. So one of the things that we understand the most about the physics of climate change is that warm air holds more water vapor. So, for every degree Celsius of increase in the temperature, we see about seven percent more water vapor in the atmosphere. And that means there is more water vapor for the atmosphere to dump on us in the form of rain.

That is not politics, that is physics. And so we can limit that by limiting the temperature rise.

*Mr. Larson. Thank you very much, and I yield back.

*Chairman Neal. I thank the gentleman. Let me recognize the gentleman from Pennsylvania, Mr. Kelly, to inquire.

*Mr. Kelly. Thank you, Chairman. And thank you all for being here today.

You know, I do -- you know, Republicans do believe that the

answer, as Mr. Reed said, is about innovation. America is the nation of innovation. There is no other country in the world that has been able to do the things that America has done, and the old idea of Yankee ingenuity, you know, that know-how, that get 'er done spirit that is out there -- and we are on the verge of doing that, and I think everybody agrees with it.

So what I would like to do is, you know, I think that often times we get caught up in a political message, as opposed to policy that really works for all Americans. The idea, I don't think, is to make traditional energy more expensive, to force people to go to another type of energy. The idea is to innovate and use what we already have, what God has given us, to use it to its best use.

In the automobile industry I can tell you the industry that I went into in 1968 and 1969, the products for that era are so different than the products today, and for a lot of reasons. But I will -- but it comes down to innovation, people going forward with great ideas, and making it make sense.

And listen, I got to tell you I think we all support everything, all of the above. But I don't think we need to sacrifice everything that is below. I think we can take a look at this and say, you know what, there is a way, there is a bridge to get to this, but let's not make it so much an effort that we bankrupt other people.

I know that 84 percent of global energy comes from fossil fuels, and I don't think we can come up with a policy today or a political solution today that says we are going to get that magic

wand out there, and I will tell you what, we are going to change.

And with that in mind, what I want to do right now -- because I really do believe we have a solution to pollution, I really do believe we can innovate our way into the future without doing drastic things, and without taxing people to the point where they no longer -- I love the idea it is not really a tax, it is -- what is it called?

*Mr. Halstead. A dividend, sir.

*Mr. Kelly. A dividend, yes. Well, I am in the automobile business. I am going to use some of that talk when I talk to people about their monthly payment.

[Laughter.]

*Mr. Kelly. But what I want to do now -- my friend, David Schweikert, probably has one of the best approaches to explaining how things go. So, David, if you would, I think you have a tremendous program that really sheds a lot of common-sense light on what it is we are trying to get to.

So at this moment, Mr. Chairman, I would like to yield the rest of my time to Mr. Schweikert.

*Mr. Schweikert. Mr. Chairman?

*Chairman Neal. The gentleman is recognized.

*Mr. Schweikert. It is a dangerous thing to yield me additional time.

For a number of you, as you know, probably once a month I take an hour on the floor and actually walk through the technology. I am incredibly optimistic about the breakthroughs. You all -- because I know everyone in this room is interested --

you all saw the battery breakthrough that happened in Japan 30 days ago, of using hydrogen wraps around -- there are really amazing things going on.

We have actually tried -- and one of the reasons Mr. Kelly is being kind enough -- I have also had a fascination on carbon tax modeling, and where I actually see some problems.

We have actually spoken about the Alaska fund. Do you understand -- and this is for everyone, Republican and Democrat, this actually hits where Mr. Larson was somewhat going -- in the -- in Alaska you have actually created a constituency for more hydrocarbon extraction, because there is a dividend coming. So you actually build a constituency in a transfer of this nature. It may be all well intended, but a constituency for more carbon because I want my dividend. So be careful what you are doing on that one. You may actually get a misincentive.

And you also actually have -- and something my physicist -- Doctor, thank you for being here. I read your testimony interesting.

We actually need to do this at a global level. And when it becomes my five minutes I am going to show you some technology where I actually think you -- as you know, there is a massive breakthrough in carbon mining right out of the air, and large-scale facilities going up, proving that the technology actually exists. Because the fact of the matter is what we do in this country -- are we about to change South East Asia or China's building of coal plants? We are going to have to deal with the reality we live in a world ecosystem.

A couple of the things we, from -- policymakers can have a real impact on -- a good example in New Mexico. A dozen years ago, large-scale solar facility. It has taken 12 years and they still haven't been able to get their power transmission line to the markets that actually need the power. We need a revolution in FERC permitting.

Are we prepared to deal with the math that we have done in our office that, if I were to do -- if we, as a society, were to do a pipeline loop in places like West Texas to grab -- instead of doing methane flare, capture it. It turns out pipeline capture of that actually has a tremendous calculation in methane greenhouse gas effect. But it is pipelines.

There are these optimistic, pro-growth approaches. And when I get my five minutes I am going to walk through some of the technology. I fear all of us are sounding as if it was 15 years ago, instead of looking forward and future-proofing policy.

I yield back, Mr. Chairman.

*Chairman Neal. I thank the gentleman. Mr. Kelly's time has expired. And now let me recognize the gentleman from Oregon, Mr. Blumenauer, to inquire.

*Mr. Blumenauer. Thank you, Mr. Chairman. I would like to enter into the record Oregon Physicians for Social Responsibilities' statement on the disastrous impacts climate change is already having on Oregon.

*Chairman Neal. Without objection.

[\[The information follows:\]](#)

*Mr. Blumenauer. And testimony from the Sunrise PDX,
powerful voices of young people and their plea for action.

*Chairman Neal. Without objection.

[\[The information follows:\]](#)

*Mr. Blumenauer. Thank you.

As -- I would like to ask Mr. Halstead if at some point you could submit to the committee an explanation of how border adjustment would work so that we are not going to be importing carbon pollution. If you would do that.

*Mr. Halstead. I would be delighted to.

*Mr. Blumenauer. I listened to Ranking Member Brady's happy talk about progress. There was no acknowledgment about the terrible impacts that are getting worse or, frankly, the Trump Administration's concerted effort to make it even worse still. And Dr. Marvel, in a moment I would like to turn to you to maybe comment on the happy talk and the situation, if you would.

But let me just say that I have been working on this for 30 years. I was part of the Portland City Council when we worked to shape what was the first major carbon initiative of a city in the United States. We made some remarkable progress over the last 30 years, giving me a sense of what is possible, but it is not clearly enough.

I spent two years as vice chair of the Speaker's Select Committee on Climate Change and Global Warming, had the opportunity to travel the world, meet with global leaders in Europe, and Asia, China. We had hundreds of witnesses, dozens of hearings, and I walked away with a renewed sense of urgency. And what I have seen in the last 10 years makes me feel even more strongly the case. This is real. It is urgent. It is getting worse.

What -- the analogy I would use is if you had a loved one

with a fatal disease that had erratic impacts, that it was getting worse, and tortured them on a variety of different ways month after month, and you could see it getting worse, and all your doctors said, "Here are some things you can do to make it better," who among us wouldn't take the long shot to try and make progress for the loved one who is being tortured by this fatal disease, to try and put it off into the future, extend ourselves? I think we all would.

But that is not what we are doing. The loved one is the planet and our families and our communities. And we are having happy talk. We are avoiding significant things that we know would make a difference, and we are actively doing things that imperil our families, our communities, the future of the planet.

I find it mystifying that people are in a state of deep denial. They wouldn't turn their back on all the doctors telling them what you should do for your loved one to not make that condition worse.

You would extend yourself. And that is not what this Congress has done. It is certainly not what this Administration has done. And that is our responsibility, to think of our loved one, fatal disease, things we could do to not make it worse before our very eyes.

Dr. Marvel, I extend the invitation to you to maybe comment on the happy talk, the fact that we have had four consecutive years -- the highest temperatures we have -- you mentioned temperature increase, you have mentioned what is happening with sea level. Are you complacent? Do you think we just innovate

our way out of this? Do you have a sense of urgency?

*Ms. Marvel. I very much have a sense of urgency. I feel both very fortunate and a little strange to live in these times, because right now we have accumulated enough evidence that we know that climate change is happening, and we know that it underpins many of these extreme events that you are talking about.

But at the same time I would caution us not to stray into doomism. We are not doomed. The science does not support inevitable doom. What the science does support is urgency. The science says we have an opportunity to reduce carbon dioxide emissions, to reduce methane emissions, to reduce other greenhouse gas emissions. And the science says that temperature changes are related to cumulative emissions of those greenhouse gases. So yes, the science supports urgency. But I don't think the science supports despair.

*Mr. Blumenauer. I appreciate the clarification. I don't support despair. But we are on a path that is going to be very grim for years to come, even if we take all these steps, and I hope that we get a sense of urgency to deal with this problem. Thank you very much.

*Chairman Neal. I thank the gentlemen. Let me recognize the gentleman from Missouri, Mr. Smith, to inquire.

*Mr. Smith of Missouri. Thank you, Mr. Chairman. Mr. Chairman, first I want to express my disappointment that our former colleague that was in this committee room just a little bit ago, Carlos Curbelo, it is unfortunate that he does not have

the opportunity to present his testimony, and being denied that last week.

With that said, I would like to present into the record what I believe to be his testimony in regards to the policy -- of how he feels. And much like most of the witnesses brought forward by the Democrat side, I typically don't agree with them, and I probably don't agree with much that is in Carlos's testimony, but I think it is important, being a former committee member, that he has this entered into the record.

*Chairman Neal. So ordered.

[\[The information follows:\]](#)

*Mr. Smith of Missouri. Thank you, Mr. Chairman. It is hard to have a serious conversation on a reasonable approach to American energy innovation when the Democrat Party supports proposals like the Green New Deal, the policies -- and policies that are boondoggles for the wealthy, allowing them to buy expensive electric cars at the expense of American taxpayers.

We are told that these are serious policy proposals. Never mind the fact that the Green New Deal is not a specific policy agenda, but rather a \$93 trillion wish list of big-government solutions that 13 Democrats of this committee has cosponsored.

Let's put this into perspective: \$93 trillion dollars would cost the entire wealth of every American 88.5 percent. So all the wealth of all individuals in this country, the proposal that they have brought forth, front and center -- 13 Democrats of this committee have co-sponsored -- would cost the entire wealth of this country 88.5 percent. As you can see, that is not reasonable. And that is not a good approach.

*A Participant. Would the gentleman yield to -- for --

*Mr. Smith of Missouri. I do not, sir. Hopefully, we can get to some policies coming forward. Never mind that some suggest that widespread adoption of electric vehicles nationwide would likely increase U.S. air pollution, compared to new gas-powered vehicles. This is based on the Energy Information Administration's long-term forecast for the number of electric vehicles expected on the road from now to 2050, and the three key pollutants regulated under the Clean Air Act.

Are we also supposed to pretend we never saw the infamous

Green New Deal fact sheet which casually referenced eliminating the entire U.S. beef industry as one of its goals? U.S. farmers produce more food than ever at an affordable price, and their impact on the environment is much smaller than the authors of the proposal would lead us to believe.

In fact, according to the EPA, the direct impact of the U.S. beef accounts for merely two percent of total greenhouse gas emissions in the United States. Eliminating an entire industry and the livelihood of American farmers to reduce U.S. greenhouse gas emissions by two percent doesn't sound like a serious proposal to me.

Mr. Powell, do you think there are more efficient ways to reduce U.S. greenhouse gas emissions, other than eliminating an entire U.S. agriculture industry?

*Mr. Powell. Most certainly. I think if we look at the Green New Deal and examine that, on whether it is real climate policy, we would have to ask whether it passes three core tests: global impact, technical feasibility, and political sustainability. And clearly, it does not.

*Mr. Smith of Missouri. Let's talk about the Paris climate agreement. Democrats want to see the U.S. re-enter this agreement and take drastic steps to reduce our carbon emissions, sacrificing our strong economy to a lopsided international agreement. Maybe my colleagues are forgetting that since 2005 the U.S. has reduced its emissions more than every country in the European Union, combined, or the fact that the world's two biggest emitters of carbon emissions, China and India, are

exempted from that agreement.

I see that my time has expired. But ultimately, Republicans believe that we don't have to sacrifice our economy or jobs in order to be a world leader in advancing innovative energy solutions. Democrats clearly don't agree.

*Chairman Neal. I thank the gentleman. With that let me recognize the gentleman from Wisconsin, Mr. Kind, to inquire.

*Mr. Kind. Well, I want to thank the Chair. I want to thank you for teeing up this hearing today. Twelve years to address an issue that is one of the great existential crises that we face as a human species on this planet is the height of legislative malpractice and dereliction of duty. And hopefully this will be the first of many hearings on the policy that we need to be pursuing to address this threat.

Dr. Jha, I want to also thank you for pointing out that my hometown hospital, Gundersen, was leading the way with zero carbon emission. And Dr. Jeff Thompson right now is on the road delivering seminars and talks to other health systems on how they can best approach it.

And in a second I want to come back to you, Dr. Jha, to just comment on -- my colleague mentioned the Green New Deal. But I want you to talk about the brown old deal that the current Administration is taking right now, rolling back policy steps to address global climate change, and how that is violating the Hippocratic Oath of first doing no harm.

But before I do, Mr. Chairman, I would ask unanimous consent that we include in the record at this time a front-page article

that appeared in USA Today yesterday that is titled "CO2 Level Highest in Human History."

*Chairman Neal. So ordered.

[\[The information follows:\]](#)

*Mr. Kind. And Dr. Marvel, I am going to ask you to comment on this article. This was based on data from the Mauna Loa Observatory in Hawaii, where they found that the carbon dioxide levels surpassed 415 parts per million last Friday.

Eric Holthaus, a meteorologist, commented in the article -- and I quote -- "We don't know a planet like this.'" He went on to state that this is the first time in human history our planet's atmosphere has had more than 415 parts per million CO₂, not just in recorded history, not just since the invention of agriculture 10,000 years ago. Since before modern humans existed millions of years ago.

The article also goes on to state that in the 800,000 years before the Industrial Revolution CO₂ levels didn't even approach 300 parts per million, let alone 415 that we are addressing today.

You mentioned that we are not at a tipping point, that this isn't irreversible and that. But what is the significance of that type of finding in regards to the time that we have to address this challenge today?

*Ms. Marvel. I agree with the quotes that you read. And I fear that we will see that headline many more times, unless we act.

I think it is correct that we have never seen carbon dioxide levels this high in human history. The most direct analogue we have is two-and-a-half, three million years ago, during an epoch called the middle of the Pliocene. And during that time we have evidence that the climate was much much warmer. Sea levels were

much, much higher. And this is a great example of the past helping us to inform the future.

*Mr. Kind. Well, for the benefit of us lay people here on the dais, and also back home, how do we know what CO2 levels were 800,000 to a million years ago?

*Ms. Marvel. So 800,000 years ago we have ice core records. We can drill into ice cores and count the bubbles, basically, and see what carbon dioxide levels were back then. When we start going farther and farther back in time, millions of years ago, we have to rely on the fossil record.

*Mr. Kind. Now there has also been some confusion in regards to global climate change and weather patterns. Can you describe the difference, the distinction?

*Ms. Marvel. So my colleague, Marshall Shepherd, who is a professor at the University of Georgia, put it really well, I think, when he said, "Weather is your mood and climate is your personality." Nobody is saying that climate change is going to get rid of weather. We are still going to have winter, we are still going to have cold days.

But what climate change is doing is it is changing that long-term average. It is changing that underlying pattern. And that is what we have to be worried about.

*Mr. Kind. Dr. Dr. Jha, getting back to the brown old deal, what the current Administration is pursuing, I wanted you to comment, because we all should be operating under the basic Hippocratic Oath: first do no harm. And this Administration unilaterally withdrew us from the Paris climate agreement -- the

only nation, by the way, in the entire world that is not a part of that agreement today. That should send a very strong signal to us.

But they have also rolled back fuel efficiency standards. They have also relaxed a rule prohibiting the use of hydrofluorocarbons. They have also removed the requirement for the reporting of methane gas emissions. They are reversing federal rules on coal power plants, including -- I mean it seems like there is a major effort to roll back the progress that we were trying to make. What significance does this have?

*Dr. Jha. Yes. So, Congressman, thank you for your question. You know, as a physician, when I have sick patients in front of me I don't have the luxury of wondering about what future innovations may help, what policies are going to be ideal. I need to act, and I need to act based on the best scientific evidence of that moment.

And what we know is that fossil fuels are deeply harmful to the American people. When we burn them we not only create carbon, but we also emit a whole set of other pollutants that our lungs and our heart just do not tolerate very well.

And so we have very clear evidence that clean energy is better for human health than fossil fuels. And the policies of the Administration -- for instance, Congressman Lewis asked earlier about, you know, the effect on under-represented minorities, and on poor communities in the U.S. The dirty cars that line our cities today disproportionately affect those communities. And rolling back our fuel economy rules is not

helpful.

*Mr. Kind. Mr. Chairman?

*Mr. Jha. It doesn't get us moving forward.

*Mr. Kind. As we conclude, may I ask unanimous consent to have included in the record at this time a list of the items that the current Administration is doing, pursuing -- to roll back efforts to combat --

*Chairman Neal. So ordered.

*Mr. Kind. -- climate change?

[\[The information follows:\]](#)

*Mr. Kind. I thank you.

*Chairman Neal. I thank the gentleman. Let me recognize the gentleman from South Carolina, Mr. Rice, to inquire.

*Mr. Rice. Let me tell you. I live in the 7th district of South Carolina. I live in Myrtle Beach, South Carolina. And we have had four storms in the last -- or three storms in the last four years. We had Joaquin four years ago, and Matthew three years ago, and then Florence last year. So we are paying attention.

But part of the confusion with folks -- and me, in particular -- you know, I have lived in Myrtle Beach since 1951. We didn't evacuate for a hurricane until Hurricane Hugo in -- what was it, 1988, or -- 1989. So, like, 38 years, we didn't have a single evacuation. I think we evacuated three or four times in the last decade. So it does appear that it is getting more frequent. But I remember in the 1980s, when they were saying that the next Ice Age coming -- was coming. I remember all these conflicting things we hear from, you know, science and the community about how these things were going to affect us.

And one thing that is curious to me, I have looked at sea level rise, Ms. -- Dr. Marvel, and I am really interested in that, living on the coast in Myrtle Beach. And NOAA tracks the level of sea level rise at a lot of stations up and down the east, you know, the Atlantic and Pacific Coast. And I have looked at those. I looked at them yesterday. And over the last 100 years, I mean, it is going up, average of about 3.5 millimeters per year for the last 100 years, way before we had

the level of carbon that we have in the atmosphere today. But it doesn't seem to be accelerating.

And I hear people say, "Well, we are going to have an another two or three feet of sea level rise if we don't do something.'" But if you look at those trends, why is it -- I am just curious. Why is the sea level not rising? Why is that not accelerating? Why is it staying at the same rate that it has been for the last 100 years?

*Ms. Marvel. So we actually have evidence that, on the global level, and the global average, sea level rise is accelerating. Now, when you look at particular local places --

*Mr. Rice. No, I am looking at the entire Atlantic coast of the United States.

*Ms. Marvel. When you zoom down and you --

*Mr. Rice. And the Pacific Coast of the United States. And, I mean, it is just a flat, straight line. It is absolutely rising, it has been rising for over 100 years at 3.5 centimeters or millimeters per year. But I am just curious about why it is not accelerating.

*Ms. Marvel. So on a global level sea level rise is accelerating.

*Mr. Rice. Okay.

*Ms. Marvel. When you look at local -- different regions -- and I am not familiar with the exact Atlantic Coast numbers you are talking about, but you can refer to the National Climate Assessment, which was released in --

*Mr. Rice. Well, I am looking at the NOAA actual recorded

numbers over the last 100 years at about 50 or 60 different stations around the United States.

I am not saying that it is not going to happen, I am just curious about why we are not seeing it right now in these actual recorded numbers.

Now, what are the trends in greenhouse gas emissions in the United States, Mr. Powell?

*Mr. Powell. So in the past 10 years or so, we have actually seen greater declines in greenhouse gas emissions in the United States than in the other large emitters in the world. Last year, due to an increase in transportation emissions, we did unfortunately see our greenhouse gas emissions begin to tick back up.

*Mr. Rice. What are the trends in greenhouse gas emissions in China, Mr. Halstead, do you know?

*Mr. Halstead. Emissions in China are going up rapidly, which is why any U.S. climate policy should --

*Mr. Rice. And what is the primary --

*Mr. Halstead. -- to follow --

*Mr. Rice. What is the primary cause of Chinese greenhouse emissions increasing?

*Mr. Halstead. Their industries are far less efficient than American ones.

*Mr. Rice. Isn't it energy production? Isn't it energy production that is causing that in China?

*Mr. Halstead. Yes, they use more coal-fired power plant.

*Mr. Rice. Why do they use coal, instead of, you know,

natural gas, or nuclear, or solar, or wind? Why do they do that?

*Mr. Halstead. Because they have weaker environmental standards than the United States, and because they don't have a price on carbon --

*Mr. Rice. Well, it is cheaper, isn't it? It is because it is cheaper, right?

*Mr. Halstead. Because the price of carbon is not internalized into the cost of --

*Mr. Rice. Okay, so it is cheaper in China to do it this way, so that is why they do it.

Now, your proposal would increase the cost of carbon in the United States. But would that make it cheaper to use other forms of energy production in China?

*Mr. Halstead. Actually, what it would do is it would compel China to follow our lead, and it would put our companies at a competitive --

*Mr. Rice. Mr. Powell, would making energy more expensive in the United States make it cheaper in China to do --

*Mr. Halstead. Our -- good question. Our border --

*Mr. Rice. Mr. Powell? Mr. Powell? If we did this plan and made energy production more expensive in the United States, would that necessarily make alternative energy cheaper in China, and therefore send them on a different path?

*Mr. Powell. It would not make alternative energy cheaper in China.

To Mr. Halstead's point, you could make a adjustment at the U.S. border, but the Chinese energy itself would not be cheaper,

no.

*Mr. Rice. Thank you. I yield back.

*Chairman Neal. I thank the gentleman. Based on precedent, we will now proceed to a two-to-one ratio here for questioning.

I recognize the gentleman from New Jersey, Mr. Pascrell, to inquire.

*Mr. Pascrell. Thank you, Mr. Chairman. This is getting ready -- it is a critical preparation for what is happening, and what will happen. So this is timely.

So we can walk and chew gum at the same time. We can use our oversight powers on article 1, and we can deal with the issues day by day, as we are doing today. No problem. No problem.

So the climate change is real. And this -- its impacts to our security, to our public health, to our economic prosperity -- already upon us, already. In fact, the first paper on climate change, Ms. Marvel, was in 18-what?

*Ms. Marvel. Eighteen ninety-six.

*Mr. Pascrell. Oh. We are just discovering this.

In New Jersey we felt its effects more than most when Superstorm Sandy came barreling through. An unprecedented surge destroyed homes, destroyed businesses. Critical infrastructure, unfathomable scale.

And once-in-a-generation storms are coming becoming all-too common. In 2017 the destruction and failed response to Hurricane Maria led to the death of over 3,000 Americans. If that isn't a two by four over your head, I don't know what is. But we will

argue it.

First of all, Dr. Marvel, I am not a Socialist. I have never been a Socialist. I don't intend to be a Socialist. But I want you to know something. I am proud of most of what they put together in the Green bill. So I signed on. People were surprised about that. I didn't agree with everything. Most of the time we don't agree with everything in any bill. But we are not Socialists. And to simply call people names because you don't want to deal with the subject, I will not say what I am thinking about that.

And you know, there is not as much land disappearing maybe depending upon what picture you look at. Let's say my friend from the south was correct, which he is not. But let's say he was. In all due respect, as I say, let's say that the land isn't shrinking that we are living on. I am going to ask the panel.

I want you to tell me quickly and tell the audience quickly. Isn't this having an already effect on our food supply, and what we can eat, and what we cannot eat in the future?

Dr. Marvel?

*Ms. Marvel. So climate change will lead to increased droughts, more frequent droughts. But, at the same time, it will also change precipitation patterns and lead to heavier downpours. The Great Plains, which are the breadbasket of America, are projected to experience drought conditions unprecedented in the last millennium. We expect to see the ranges of certain pests expanding, and changes in the growing seasons. And all of these things could have implications for agriculture and our food

security.

*Mr. Pascrell. Anyone else?

Doctor?

*Mr. Jha. So there is very clear evidence that the nutritional aspects of the food that is grown in an environment with climate change is substantially diminished. So we may be able to potentially increase crop yields, but that food quality is going to be lower.

There is also very good evidence --

*Mr. Pascrell. The quality of the food is going to be different.

*Mr. Jha. The quality of the food. And --

*Mr. Pascrell. We are not just talking about the quantity.

*Mr. Jha. Correct, because we want to eat high-quality food.

And one of the other things we want to do is we want to eat safe food. And it turns out that we are seeing increases in food-borne illness as a result of climate change.

And so, the combination of worse quality and worse safety in the food supply are real issues that are going to affect the health of Americans. And I am going to see it, as a doctor, when I am taking care of patients.

*Mr. Pascrell. Yes, and that might be one of the reasons why we got out of the Paris Agreement. How cockeyed is that? Anyone else want to respond to the question about food?

[No response.]

*Mr. Pascrell. Okay. So we have come to a major point, Mr.

Chairman. We came to the point where we are looking at global warming. We are all agreeing with it now. Wow. I don't know where the change occurred. It must have been an immaculate conception of some sort here.

So there are so many things that we could talk about on climate, and it is so fascinating. Every day we pick up the newspaper, as my brother from Wisconsin pointed out. So the best or the worst is yet to come. What are we going to do about it? We are the problem.

I yield back.

*Chairman Neal. I thank the gentleman. Let me recognize the gentleman from Illinois, Mr. Davis, to inquire.

*Mr. Davis. Thank you very much, Mr. Chairman, for calling this very informative hearing.

You know, I have always been told that if you want to go south, the first thing that you do is turn and face in that direction. Then every time you would take a step, you get a little bit closer to Richmond. But if you keep heading up towards New York, it is going to take a long time to get to Alabama, and chances are you may never ever get there.

And so I am pleased to hear the approaches that different individuals have taken to try and help reduce the carbon footprint.

I am delighted to work with Mr. Kildee as we try and promote battery technology and get us to another way perhaps of transportation.

I was very pleased to hear Mr. Lewis raise the question

about the impact of global warming on minority health, which we already know there are many disparities. We also know they are population groups that experienced chronic illnesses. And all of this is a part.

Now it may take a long time before we get to where we are trying to go, but I am also pleased to come from a place like Chicago, Illinois, where 21 of our hospitals have put together something they call a green initiative, where hospitals in the neighborhood where I live -- Illinois Masonic, West Lake, West Suburban -- have made tremendous efforts to try and reduce the utilization of approaches and materials that they have determined are going to be helpful (sic).

Dr. Jha, could you further talk about the impact of global warming on those individuals who are experiencing chronic health issues, and how, even if we don't get to the point that we are trying to get to, we can do some things that are going to reduce and improve the way we treat population groups that we know are negatively impacted by carbon and carbon emissions?

I remember 30 years ago being in the Chicago City Council, where we reduced the amount of lead that could be in gasoline sold in the City of Chicago. So it takes a while, but can we get there?

*Mr. Jha. So thank you for your question, Congressman. And absolutely, the answer is we can get there.

I want to start off by reminding us one in five kids who is diagnosed with asthma, their asthma is a direct result of fossil fuels, mostly cars, and the emissions that come from cars. So

this is not a theoretical exercise. And, of course, we know asthma in kids disproportionately affects poor communities, minority communities.

The other thing that has been really striking to me, as I have listened to this conversation and people talk about the cost of energy, is we are already all paying for this stuff. I mean, when you have asthma and heart disease you are paying for it through Medicare, Medicaid, through -- all the businesses in America are paying for it, individuals are paying for it. So the idea that it is too expensive to make energy cleaner seems to me silliness in the context of the fact that we have a budget, we are committed to caring for our elderly, we are committed to caring for kids and poor people in this country, we are paying for all of that. And if we don't take those costs into account, I understand you can make the numbers look whatever you want to make them look at, but this is, I think, a very real issue.

Now I do think that we are -- it is very clear that fossil fuels disproportionately harm underserved communities. We see the harm in minority communities, in urban areas with cars, with the kinds of energy sources that these communities have. And so climate change is going to disproportionately -- it is already disproportionately harming those communities.

But I am also very optimistic that, if we act, and if we act soon, we can improve the lives and health and well-being of all Americans, but disproportionately benefit those communities.

*Mr. Davis. Thank you very much.

Mr. Chairman, I yield back.

*Chairman Neal. I thank the gentleman. Let me recognize Mr. Brady to inquire.

*Mr. Brady. Thank you, Mr. Chairman. And thank you to the witnesses today.

I think there are days when Washington should be renamed the City of False Choices. Mr. Powell talked about this. As we are often told -- and are today -- that we must choose prosperity or a cleaner, sustainable planet for our kids, that we can't have both, cannot have both. But I disagree. I believe -- in fact, I am confident we can have prosperity, and better health, and a cleaner environment for our kids and grand-kids.

I think one of the obstacles is politics. So we have gone from an issue full of claims of climate deniers to now we seem to be progress deniers and innovation deniers. And I think that is a mistake. The U.S. is leading the world in reducing greenhouse gases. You can't deny that. Renewable energy is up, and continues to grow -- a lot because of the work of this committee, by the way. You can't deny it. CO2 emissions have fallen to their lowest level in a generation. That can't be denied. And emissions of the 6 most common pollutants that are tracked by the EPA have fallen 73 percent over the last 3 decades. You can't deny that. We are making progress.

Is it enough? Absolutely not. But we can learn from what has brought us that progress to solve the challenge ahead of us, which is real. The U.S. is a world leader in greenhouse gas reduction because we are the world leaders in clean technologies. We ought to be pushing that in a major way as a solution, the

solution here.

And I know from Texas -- I guess we all know our own state best, but I look around our state in the development and deployment of clean technologies. They are coming from a surprising source, from traditional energy. The dirty oil and natural gas you claim it to be -- the truth of the matter is -- and I know this -- so since 2000 natural gas and the oil industry is the leading industry in clean technologies, and zero and low carbon technologies -- \$108 billion investment just since 2000. That is not counting even the last two years.

I know in Houston -- I watch these businesses and tour these businesses -- they are focused on new technologies that reduce greenhouse gas emissions, with new technologies reducing carbon footprint, carbon capture, more renewable energy. As I mentioned, the methane reductions in the Permian Basin and beyond are stunningly positive.

We can't be in denial of the progress they are making and the role of innovation in America. This is the solution.

And I will tell you, Dr. Jha, I disagree with one area of your comments.

I was alarmed when the 2018 Energy Information Administration report found mortality rates in America tend to be higher in winter months, when higher energy costs forced consumers to cut the temperatures in their homes, or offset their heating costs by reducing spending on food and medicine. The Energy Information Administration showed 1 in 5 households pay the energy bills over other necessities, such as food and

medicine, and 1 out of 10 households admitted they keep their home at a unhealthy or unsafe temperature because they can't afford the heating oil.

So in a follow-up to that, the National Bureau of Economic Research made the case that lower heating costs for these struggling families, vulnerable families, because of natural gas, which has lowered that cost, prevents more than 11,000 deaths annually because people are struggling with those costs.

I believe oil and natural gas, because they are so deeply involved in clean technologies today, can help America be the world leader in clean technology around the world. That is why I talked about the need to have zero tariffs and zero barriers for U.S. technology to be sold around the globe.

Mr. Powell, can I just finish with this? I didn't give you much time. But am I on the right track here, that we ought to just knock aside the false choices, and really focus on the solutions that are already showing promise, and that can take us a long way toward dealing with the climate change challenge the world faces?

*Mr. Powell. Absolutely, Leader Brady. And first, thank you for your leadership on the deal that extended and expanded the 45Q tax credit for advanced CCS technologies and the 45J tax credit that expanded support for nuclear technologies.

I would take issue with the idea that fossil fuels are the problem. I think it is emissions from fossil fuels that are the problem.

*Mr. Brady. That is right.

*Mr. Powell. And technology can help us solve that emissions challenge. If we look at the single greatest source of U.S. emissions reductions over the past two decades, it has been driven by the shale gas revolution. The 30 percent decline in the emissions in our power sector, two-thirds of that are due to shale gas. And shale gas is a result of a grand public-private partnership with a lot of basic and applied research from the Department of Energy and a tax incentive, the Alternative Production Tax Credit that this committee passed back in the 1980s, and that was very influential in scaling up that technology in the 1990s.

*Mr. Brady. Thank you, Mr. Powell, and thank you, Chairman. I went a little over, so --

*Chairman Neal. I thank the gentleman. I would like to recognize the gentlelady from California, Ms. Sanchez, to inquire.

*Ms. Sanchez. Thank you, Mr. Chairman. And I want to thank all of our witnesses for joining us today.

Every day that the Federal Government ignores climate change, future generations are doomed to pay a very heavy price indeed. We know that we need to solve this crisis, and we know how to reduce carbon emissions.

The State of California, for example, is already doing it by making bold investments in renewable energy, energy storage, and zero emission transportation. And California is the fifth-largest economy in the world, and it continues to lead where our President will not. So it is not impossible to pursue a clean

and renewable energy strategy and still have a healthy, booming economy.

I want to focus today on what will happen if we don't act, because each -- no single state and no single country can solve this problem alone. But in the meantime communities like mine are already suffering in the absence of federal action. The same sources of greenhouse gas emissions also produce particulate matter. And we know that this pollution is linked to numerous health problems that include aggravated asthma, stroke, and diabetes.

And guess who seems to live the closest to plants and factories that produce the particulates? Surprise, surprise, working families and, overwhelmingly, people of color. According to a recent study, Hispanic Americans suffer from 63 percent more of the pollutants than they are responsible for creating, while white Americans experienced 17 percent less of the pollution that they are responsible for. Disadvantaged communities are also the least prepared to adapt to harsh temperatures. When we talk about who will predominantly bear the consequences of the problem, where you live and who you are do, in fact, matter very much.

Dr. Jha, I would like to expand on how climate change affects -- I would like you to expand, pardon me, on how climate change affects minority communities. What other disparities can we expect, as climate change accelerates?

*Mr. Jha. Thank you, Congresswoman, for the -- for that question. And I agree with Leader Brady's earlier point about

not having false choices. I think we should not ask people to choose between cheap energy and having -- suffering asthma and heart disease. I think we can deal with both effectively.

What we know is -- actually, the based on the data that you have described -- that minority communities have greater exposure to all sorts of environmental toxins, but certainly particulate matter that comes from burning fossil fuels. We also know that that has a disproportionate effect on cardiovascular disease, on diabetes. We see higher rates of diabetes in communities of color. We see higher rates of cardiovascular disease. We see substantially higher rates of asthma.

And then, of course, there are all the downstream effects of that. When you get sick, your ability to go to school is affected. We know that in warm temperatures, when there is not adequate air conditioning, kids perform less well in schools, in tests. And then, of course, there is an entire health care system that is built to respond to that. And if people don't have access, and if they don't have access to high-quality care at a price they can afford, that has all of the other detrimental effects.

So climate --

*Ms. Sanchez. I am going to interrupt for just a second --

*Mr. Jha. Please, yes.

*Ms. Sanchez. And I am going to say you also mentioned Zika.

*Mr. Jha. Yes.

*Ms. Sanchez. Now in the United States, because our

temperatures are warming.

*Mr. Jha. Yes.

*Ms. Sanchez. There are other tropical diseases that have no cures, right?

*Mr. Jha. Correct.

*Ms. Sanchez. That potentially will spread to the United States. And the most vulnerable populations are the populations that don't have access to health care. Is that not correct?

*Mr. Jha. It is absolutely correct. And Zika, I think, is a very good example of a disease that actually has been with us in the global community for decades.

But the reason it landed and stuck in Brazil and it is stuck in the U.S. is because the environment has become much more hospitable to the aegypti mosquito. We have done a nice job of making the homes -- our communities a little bit warmer, and the mosquitoes are now happy to hang out here, and they don't just carry Zika, but also chikungunya and other diseases.

The thing that I worry about, the thing that keeps me awake at night, is we don't even know what diseases are going to come as the world becomes more interdependent and interconnected, and as we are changing the environment for vectors. And the one thing I do know is that poor communities, communities of color, they are going to be affected disproportionately. But none of us are going to escape the effects of climate change.

*Ms. Sanchez. So climate change affects, Dr. Marvel -- it is an existential threat to everyone, is that not correct?

*Ms. Marvel. It is, yes.

*Ms. Sanchez. And you had a very good analogy at the beginning of the hearing in your testimony. I want to sort of interject my own analogy. It is like we know that smoking is going to kill us, and we refuse to cut down on smoking because that other country over there, that other guy, is smoking even more. So why should we have to cut down on smoking? It is kind of inane to say that, oh, because of economic reasons we choose to do nothing, because we will be affected ultimately, and pay the ultimate final price. Is that not correct, Dr. Marvel?

*Ms. Marvel. Yes. I agree with with Dr. Jha, that we should beware of false choices. We don't have to care about climate change or the economy. We don't have to care about climate change or justice. We have to care about all of these things, and I think we can.

*Ms. Sanchez. Because, ultimately, all of us pay the price.

*Ms. Marvel. That is correct.

*Ms. Sanchez. Thank you, and I yield back, Mr. Chairman.

*Chairman Neal. I thank the gentlelady. With that, let me recognize the gentleman from New York, Mr. Higgins, to inquire.

*Mr. Higgins. Thank you, Mr. Chairman. And obviously, this is a hearing that has long been deferred, dealing with a critically important issue relative to what is, really, a national and global public health crisis.

Last year there were two major reports that came out in the United States written by 13 federal agencies, and another by an international group of health experts, and published in prestigious global journals pointing to the fact that climate

change is, in fact, a public health crisis.

The hots are getting hotter, the wets are getting wetter, the droughts are getting drier, and the forest fires are getting more fierce. There is a real impact on physical and mental health. Waterborne gastrointestinal diseases are increasing, particulate matter in air is causing heart and respiratory diseases, and insect-borne diseases are also increasing.

The argument here is that some have said that the United States has made progress, and there is no doubt that in promoting alternative energy sources, non-carbon energy sources, that there has been progress. But I think the point has to be made that the progress is not nearly proportional to the problem. And, therefore, aggressive tactics need to be taken now, using as a basis for them these reports that largely came out last year.

Mr. Halstead, the Climate Leadership Council is made up of a number of organizations, including, you know, some of the larger auto manufacturers, which I think is, you know, is his reason for some optimism. It calls for the setting of a \$40 per ton carbon dioxide produced, adding \$.36 to each gallon of gasoline. It would raise about \$200 billion a year, and the average family of four would receive about \$2,000. Is that correct?

*Mr. Halstead. That is correct.

*Mr. Higgins. How that works? Okay.

Here is my concern. Some of the companies that are listed are huge carbon producers. And I remember when we were in a financial crisis, we gave huge bailouts to the auto industry so that they could become more energy efficient. They were using

public dollars to do what they wouldn't do with their own dollars.

And then this Administration called for a relaxation of energy-efficient standards for the automobile industries. And now one of the companies, including the companies that are involved in your coalition, seem to be defending the need for greater energy efficiency. And it doesn't seem like you can have it both ways in this argument.

*Mr. Halstead. Thank you for the question. I think that there is a unified voice coming from corporate America, which is that a price on carbon is the most cost-effective solution. And ultimately, there are two approaches to solve climate change: you can regulate, or you can price. The members of our coalition, including the fossil fuel members, by joining our effort are basically saying that they would prefer a high price on carbon in exchange for regulatory certainty.

And just to clarify, the different pillars of our plan would be non-severable. It is important to build trust between the two sides. Environmentalists are, of course, concerned that the high carbon price would not be honored by the other side, and some on the business or conservative side are concerned that the regulatory streamlining would not occur. So we are in the trust-building business. But when you put the deal together, it is a plan that is a bipartisan plan where all key stakeholders can win.

*Mr. Higgins. So, you know, in the end the underlying idea here is to make energy derived from fossil fuels more expensive.

And your argument is that the free market will move quickly and effectively toward renewable energy, and lower carbon solutions.

So there really seems to be two options here. So we have one of a government regulation approach versus that of a market-driven approach, both of which are designed to do one thing that is essential to all of this, and that is cutting emissions.

With that I will yield back.

*Chairman Neal. I thank the gentleman. Let me recognize the gentleman from Arizona, Mr. Schweikert, to inquire.

*Mr. Schweikert. Thank you, Mr. Chairman. And look, I will try to slow down. I have had, A, a lot of coffee; and, B, this is one of my areas of fascination.

*Chairman Neal. How can we tell here?

[Laughter.]

*Mr. Schweikert. Yes, I know. It is -- look, it would probably be cheaper in my life if I would just take up alcohol and give up coffee. But I do -- if any of you want a cappuccino, we do have a cappuccino machine in our office.

And look, we are one of those offices where we have a full-time person who just does disruptive research.

I am actually incredibly optimistic of what is happening, and this committee deserves some of the credit, even though we may not completely understand it.

I actually don't believe that it is just two. I believe there is a third lever, and that is disruptive technology. And the fact of the matter is you have got to be careful. We never - - if we ever were to do a carbon tax model -- that you don't

create an international arbitrage of saying great, high-carbon -- or high-power use, I will do it overseas. There is this sort of we have to deal with -- the fact of the matter is it is a world marketplace of greenhouse gases, energy production, those things.

I want to actually do just a touch of some of the things that this committee should actually be grateful for, for the success that is happening. This is actually a facility -- it is a sort of an experimental generation right next to a coal facility outside Houston. There is no smokestack, it captures everything. It is a true carbon capture facility, demonstrating that you can take something that is environmentally questionable -- and that is -- you know, the old style use of coal -- no smokestack, capture everything. And this is actually partially the result of what this committee did a year ago, by actually starting to adjust the carbon capture tax credits.

And I actually believe, as a committee, we should even be more creative to actually provide that tax credit if someone wanted to sequester that carbon in concrete, or plastic, or other things other than just enhanced oil recovery.

You all saw the article last week of what the Dutch are about to do, where they have a huge depleted oil field and they are going to actually do this type of technology, capture the carbon, shove it back into the ground. It is sequestration. It turns out why this is important is the ability to have sort of that baseline power infrastructure we already have -- this committee actually helped produce this.

This is a facility I am particularly excited by because of

the technology and how they spin the turbines. This is a natural gas facility. No smoke, no pipes -- or, excuse me, no smokestack. They capture everything. And they capture not just CO2, but other inherent greenhouse gases. And the brilliance in the cycle they have designed is they super-heat the gas, and smash the gas through the turbines, instead of heating steam and burning it through. This exists today. And my understanding is they are about to build a 50-megawatt plant with this technology that is going to be up and running in about 16 months.

There should be joy in this room that the technology is here. In many ways we are having the wrong discussion, the wrong arguments.

This is the one -- we, as a committee, but we as a community, that cares about -- this may be a global solution.

You all know about the facility that is going up in British Columbia, Canada right now, a large-scale CO2 mining of the air. They have had a technology breakthrough, cost-wise. And the amazing thing, they are going to catch the CO2 and then burn -- you functionally combine it, crack it, and you have another energy source. The technology that just a year or two you would have -- go -- we would have laughed at, it exists.

And why this is important is, even if we were angels, the rest of the world probably isn't going to be. We need a worldwide ecosystem solution. It turns out carbon mining is one of them.

[\[Slide\]](#)

*Mr. Schweikert. This slide -- just as a thought experiment

-- we need to start being honest about the actual math. The best number I have been able to find is 2015.

The yellow, every bit of photovoltaic solar panels we introduced that year, well, the other side was baseload nuclear that came offline 2015. All that solar that entered the marketplace provided no benefit, because our baseline solar went offline.

We need to understand non-carbon-emitting solutions. It is complicated. And actually, you have all seen the article, because I know you read these crazy things. Uranium mining, there will never be another uranium mine, we now extract from sea water. We have broken through on the technology.

The last one -- I am going to do this really fast, because I only have a few seconds left. This will be the single biggest disruption in our society, I believe, over the next quarter century. We have broken the Holy Grail on plant biology. Remember, a plant cell grabs an oxygen molecule when it meant to grab a carbon molecule, and it spends lots of its energy purging the carbon? What happens tomorrow if world agriculture is 40 percent more efficient?

You do realize world agriculture produces 2.2 times more greenhouse gases than every car on Earth? A 40 percent increase by just adopting this seed stock would be as if you removed every car off the face of the earth. The disruption is here. We need to understand the technology and promote it.

I yield back, Mr. Chairman.

*Chairman Neal. I thank the gentleman.

*Mr. Schweikert. Thank you.

*Chairman Neal. With that let me recognize the gentlelady from Alabama, Ms. Sewell, to inquire.

*Ms. Sewell. Thank you so much, Mr. Chairman, for hosting this hearing, the first time in 12 years that we have had a hearing on climate change.

I would like to extend my remarks for the record, and I will submit those. But I would like to also, Mr. Chairman, submit for the record this article that I am going to reference in a few minutes from Inside Climate News regarding the EPA findings that African-Americans are disproportionately affected by climate change.

*Chairman Neal. So ordered.

[\[The information follows:\]](#)

*Ms. Sewell. Thank you, Mr. Chairman.

I would like to ask you, Mr. Jha, if you could also talk about continuing the conversation that my colleague, Ms. Sanchez, brought up regarding environmental disparities. This particular article said that race, not poverty, was found to be the strongest predictor of exposure of health-damaging particles created from fossil fuels, and it said that the EPA noted that black Americans are subject to higher levels of air pollution than white Americans, regardless of their wealth.

Can you also talk a little bit about these environmental disparities in the African-American community?

*Mr. Jha. I would be happy to, Congresswoman. It is -- as I alluded to earlier, and I think it might have been a report that Mr. Lewis had also mentioned, there is very good and overwhelmingly clear evidence that African-Americans in our in our country breathe much more polluted air. They are exposed to a whole host of environmental toxins in ways that other Americans are not. And while income plays a small role in that, it is not fully explained. And so it is not just about income disparities, it is very much a racial disparity, as well.

And what we know is that there are very substantial health effects of all of that. And the health effects -- I have talked about some of them. But when we see the higher rates of asthma, the heart disease, the stroke in the African-American community, environmental effects are a major contributor to that disparity. So that is a very big issue.

This gets into all sorts of issues around urban planning,

and how we plan for things. When you -- we look at where daycare centers are placed in African-American communities, they are often in -- close to the busiest intersections. And so those kids are breathing in toxic air all day.

*Ms. Sewell. You know, one of the things -- not to -- because I have limited time --

*Mr. Jha. No, please.

*Ms. Sewell. One of the things that I have been tackling in my office is the fact that parts of my rural communities, especially in the rural parts of Alabama, that there are serious water and sewer issues. There are many folks in my district in the Black Belt, which is where I grew up -- I grew up in Selma, Alabama, very much known for its civil rights, but also it is in the heart of the Black Belt, which is the agricultural belt of Alabama -- and that we have water and sewer problems, where people can't afford to be connected to a -- one of the centralized water and sewer lines because they are so far out, that -- they often don't have septic tanks, which means that they have direct pipes that lead right outside of their homes, and so the soil is being contaminated, our waterways are being contaminated.

And one of the things that you talk about is resilience requirements for our hospitals and the like. I know that many of my rural hospitals are struggling just to keep the doors open and the lights on. What kind of resiliency requirements would be needed for our hospitals to be -- and nursing homes to be prepared for this climate change?

*Mr. Jha. So it is a fantastic question. And I will start off by just commenting that there are parts of America where access to clean water, which is not just a fundamental right, but something that we just take for granted in large parts of the country --

*Ms. Sewell. We do. And it is not just in Alabama, it is all across this nation.

*Mr. Jha. Might I mentioned Flint, Michigan as an example of a place that has suffered from this? But Flint and Alabama are not the only places.

*Ms. Sewell. Yes.

*Mr. Jha. We see this in large parts of the U.S., and it is a travesty. It is a travesty, and should be unacceptable in the year 2019.

On the issue of resilience in rural hospitals, Congresswoman, I think you -- there are a series of questions. There a lot of policy issues that are affecting rural hospitals, and a lot of rural hospitals are struggling to stay open. And Medicare has had some important policy innovations around critical access status.

But ultimately, these hospitals are safety net institutions for the communities that they serve. And what we need them to do is we need them to survive storms, to do a better job of predicting heat waves, to do a better job of staffing. Earlier I said hospitals are no good if their doctors and nurses aren't there, so we need to spend a lot more time and energy on this.

And what has struck me as most striking -- I think the

congressman from New York mentioned this as a public health crisis, and I agree with that -- you know, 0.05 percent of the NIH budget goes to studying the health effects of climate change. Not even one tenth of one percent. So if we just refuse to study and understand these issues, we should not be surprised that we are not going to make the kind of progress we need --

*Ms. Sewell. Do you think that we, as a Congress, should be spending more money to help shore up our hospitals and our nursing homes for this eventuality?

*Mr. Jha. You know, where exactly those dollars come from is an important question. I think that the Federal Government -- states certainly have a very substantial responsibility. The Federal Government has often taken the leadership role in helping these institutions, and it needs to again.

*Chairman Neal. I thank the gentlelady. Let me recognize the gentlewoman from Washington State, Ms. DelBene.

*Ms. DelBene. Thank you, Mr. Chairman. Thank you so much for holding this hearing. To all our witnesses for joining us today on this incredibly important topic, this conversation is long overdue.

On May 7th Washington State enacted groundbreaking clean energy legislation that commits the state to a 100 percent clean energy by 2045, eliminates coal power by 2025, and by 2030 they must be 100 percent carbon-neutral. This is one of the most ambitious clean energy proposals in the nation. I am proud to be from a state where we take this issue very seriously, and have been leading in trying to combat climate change.

Washington's bill ties equity, labor, and climate reduction provisions together in order to update the electricity grid. And further, Washington's approach to the bill was unique because it really took into consideration the concerns of several different industries and found compromise. In passing this groundbreaking clean energy policy we are also the first state to bring together industries who have historically been at odds with each other on issues. And I think what is important is that people came to the table.

Mr. Halstead, when you talk about your efforts, and you talk about a national climate policy, one, how do you feel about the need to bring many different points of view together to solve this issue so we have a national policy? And also, can you comment on state policies as we see states move forward, versus the need for a federal policy?

*Mr. Halstead. So thank you for the question very much. We believe that it is imperative to have a climate solution where all sides can win, bringing unusual stakeholders together. That is what we have done in our coalition.

I want to highlight one other big development today that has not been mentioned yet, which is there is a new effort, an organization that was just launched, called the CEO Climate Dialogue that has a dozen leading companies and four leading environmental groups calling for a carbon price. That is the unifying theme coming from corporate America.

You asked about the State of Washington, where there has been a tremendous amount of climate leadership. We also think

that a company that you are quite familiar with, Microsoft, deserves a tremendous amount of credit, because it has recently redoubled its climate efforts, for example, by setting itself an internal carbon price of \$15 per ton. It recently also joined as a founding member of the Climate Leadership Council.

What these companies are telling us is that, in addition to state action, in addition to their individual practices, what we need is a bipartisan national solution, one that is based on a carbon price, and giving companies the certainty, the flexibility that they need to innovate because there is no power that is more effective in innovation, no greater driver than the marketplace and an incentive through a carbon price to drive innovation.

*Ms. DelBene. And I guess I would add that it needs to be a high standard, too.

Dr. Jha, you brought up a very important issue, I think, in terms of -- that we were already paying for the impacts, and that we don't always take into account the costs, especially the health care costs, the human costs. Can you talk a little bit about how you think we can best quantify that and bring that into our conversation about the economic impact of climate?

*Mr. Jha. Yes, absolutely, Congresswoman. So, you know, one of the frustrations when you do spend 0.05 percent of the NIH budget on a topic is it is really hard to get high-quality data on that topic. And so we have not studied these issues to the level of detail that we need to. And I think that has got to be a priority of our government.

On the issue of cost, what we see is -- the diseases I have

been talking about -- asthma, heart disease, stroke, these are incredibly expensive diseases to treat. They are far more cost efficient to prevent. And what we know is, as I mentioned in my testimony, it is kids and the elderly who are primarily at risk. So it is Medicaid and Medicare that is primarily paying for all of this.

We think that already the cost of all of the different things that I have talked about run into the billions of dollars, but that is an estimate that is going to grow very substantially. And what we need is we need high-quality data to really quantify the impact of climate change on our federal -- on the taxpayer bill, because when we talk about the cost of carbon and the cost of energy it is sort of -- imagine -- you know, my wife and I, we run a household with kids, and we think about our energy bill, but we also think about our health care bill. And if we had to pay a little bit more on energy, but could save a whole bunch on health care, we would make that tradeoff. And it would be a false tradeoff to say you should just look at one of those issues alone.

*Ms. DelBene. Thank you. I yield back, Mr. Chairman.

*Chairman Neal. I thank the gentlelady. Let me recognize the gentlelady from Indiana, Mrs. Walorski, to inquire.

*Mrs. Walorski. Thank you, Mr. Chairman. I would like to ask unanimous consent to insert into the record an op ed by Purdue president and former Indiana Governor Mitch Daniels, an article entitled "A Genuine Big Idea That Could Fix the Border Problem."'

*Chairman Neal. So ordered.

[The information follows:]

*Mrs. Walorski. Thank you. Governor Daniels details how a chain of green energy installations could have enormous impact and many possibilities, while providing the necessary protective features for a new physical barrier to prevent illegal immigration at our southern border.

Thank you to all of you that are here today. I have been waiting to have this conversation. I am glad to be here, as well. And I never miss an opportunity to highlight the groundbreaking things Hoosiers are doing in the State of Indiana. And it gives me a perfect chance today to talk about innovations, and why innovations are important, and what things are happening in my state as we pioneer in the field of clean and renewable energy.

Indiana is a leader in the Midwest when it comes to clean energy solutions. In fact, my home state is home to almost 87,000 clean energy jobs, which spans through a number of different sectors, including clean fuel, advanced grid, renewable energy generation, advanced transportation, and energy efficiency. Even more impressive is that clean energy companies in Indiana saw an addition of nearly 4,000 jobs in the past year alone.

Furthermore, we have institutions that are great, like University of Notre Dame, Purdue University, Indiana University, leading the way to research and providing solutions to today's complex environmental challenges that our state and our country have to address.

Let's not forget about the rise of solar power use as part

of an overarching energy strategy by many municipalities in my district such as Argos and Peru, Indiana. But, despite all these positive trends, Democrats in Congress have rallied around this "Green New Deal," a radical agenda of over-regulation, taxation, and economic stagnation.

I think we need a sensible and realistic policy vision for addressing environmental problems here in America. And all the Green Deal would accomplish is rolling back the progress that we have seen in states like mine: job creation, innovation, things that work. We should be doing everything we can to incentivize growth in the clean energy sector, not putting up roadblocks to those who are trying to reduce their impact on the environment and do the right thing.

Mr. Powell, can you go into detail about the types of policies that Congress and this committee should pursue in order to incentivize growth in the clean energy sector, like what I have just described in my home state of Indiana?

*Mr. Powell. Sure. And first let me say, Congressman, that ClearPath was very pleased to work with the Department of Energy to help launch its Make Nuclear Cool Again effort, which -- I believe the first event was at the nuclear engineering school at Purdue University. So I thank the great State of Indiana.

*Mrs. Walorski. Absolutely.

*Mr. Powell. Fantastic nuclear engineering facilities -- for launching that very important initiative.

So first I think we can look back just at what you all did in the past Congress. You passed historic incentives, beginning

in this committee, in both the 45Q tax incentive for carbon capture and sequestration technologies, and the expansion and reform of the 45J credit for advanced nuclear technologies, which will potentially put tens of billions of dollars of incentives into two extremely important, highly-flexible, clean energy technologies. And I think that this can be a model for the sorts of things that this committee can do in the future.

I will come back very quickly to the bill that Congressman Reed and Congressman LaHood introduced this past December, the ESIC tax incentive. I think the core innovation there is that you would start to think about these not as one-off technology-specific measures, but setting up a permanent structure that would enable generations of new innovative technologies to continuously come in, attempt to prove their market feasibility, bring their costs down, but then steadily ramp off each of those technologies, wean them off of the incentives, prove that they work or don't work, and, if they don't work, we move on to the next thing. And we are continuously developing a pipeline of new, clean, high-performing technologies that we can sell around the world.

*Mrs. Walorski. I appreciate it. And Mr. Powell, you mentioned in your testimony that we have to provide -- take an aggressive and comprehensive look at this public-private technological innovation policy to keep making energy cleaner and cheaper.

You talk about a financing policy must stimulate the breakthrough, innovation needs to expand, continuing to move in

the direction of cheap technology options for decarbonization. Why is the carbon tax ill-suited to foster this type of technological breakthrough?

*Mr. Powell. Well, if we are primarily focused on bringing down the cost of innovative new technologies, we would look at things that are specifically focused on those innovative new technologies. And a price on carbon will be a great thing for deploying existing clean energy technologies, but it wouldn't do as much for the innovative technologies.

*Mrs. Walorski. I appreciate it.

Mr. Chairman, I yield back. Thank you.

*Chairman Neal. I thank the gentlelady. Let me recognize the gentlelady from Wisconsin, Ms. Moore, to inquire.

*Ms. Moore. Let me thank the chairman, and I want to thank the witnesses for their patience, thank all my colleagues for the excellent conversations and questions that they ask.

I just want to jump right in with you, Dr. Halstead. In your written and verbal testimony you alluded to the 4 former chairs of the Federal Reserve, 27 U.S. Nobel Laureates in economics, 4 former chairs of the President's Council on Economic Advisors, 8 Republicans, 7 Democrats, 3,500 economists in all 50 states leaning into the notion of, first of all, acknowledging that carbon -- that climate change was real, and focusing on how we have to price carbon.

I guess the real -- I want to get into the nitty-gritty. With all of this expertise, and a lot of it in government -- and I see that the CRS has also leaned into assessing the price of

carbon and the revenue that it could generate -- we have -- I have had a hard time getting the CRS to make those same sort of pricing decisions on, for example, health care, Dr. Jha, what would be -- you know, what would be the cost or the savings on stopping measles or Zika.

And I am wondering what -- have you worked -- have they worked with the CRS? What kind of innovations can we make with CRS to propose a carbon price, or to assess and evaluate how health care -- I want both of you all to -- could also fit into this frame.

*Mr. Halstead. Thank you very much for your question, Congresswoman.

I am not aware of direct work done by these economists on health care, but I think what is remarkable by the group -- about the group of economists you mentioned is that it is bipartisan. It represents the economic brain trust to every President since President Ford --

*Ms. Moore. Did they develop --

*Mr. Halstead. And they are unified --

*Ms. Moore. -- these models with CRS?

*Mr. Halstead. I am not aware.

*Ms. Moore. Okay. Dr. Jha?

*Mr. Jha. Yes, I am not -- I am also -- thank you for the question, Congresswoman. I am not aware of any research done by the Congressional Research Service that has tried to quantify the health costs to the federal or state governments, a study --

*Ms. Moore. And the savings. But have you tried to insert

those discussions into to this? Because this has been a source of frustration. I know we had a former member of the Congressional Black Caucus who was a physician. They couldn't get the CRS to say the savings, for example, on vaccines would be this or that. Have you found that to be a barrier?

*Mr. Jha. So I have not engaged with the CRS directly on this. Academics and think -- academic institutions, think tanks often do this kind of analysis, and do this kind of work. And what has become very clear from our hearing today is it is sorely, sorely needed.

The funding for it, because it has to do with climate change, has not been present, and we do need resources.

*Ms. Moore. I would really like to work on that, so I am hoping that you will be available.

Let me just lean into some other things that have been brought up with regard to environmental justice.

I -- Dr. -- I would -- Halstead, I really would like to know how carbon pricing won't exceed the amount of resources that people in vulnerable communities have. I mean it is -- it sounds good. Giving rebates sounds good. But I am wondering what safeguards are in place to make sure that the poorest people don't find themselves without energy, or find themselves -- you know, the last one on the line to the changes. Thank you.

*Mr. Halstead. Thank you. The U.S. Treasury Department studied this, and they found that the bottom 70 percent of Americans would win economically under such a plan, and the lower-income Americans, the lower deciles, would actually do the

best, simply because their fossil fuel use tends to be the lowest, and every American citizen would receive the exact same rebate.

Now, one of the interesting points is that, while these studies show that 70 percent of American families would win from solving climate change, as you point out they don't take the health consequences into effect. And if you include those you would find that American families would win even more.

The other thing I would mention is that half of American families don't have \$500 to their name in case of a medical emergency. When you give that family \$2,000 per year, to them that makes a very, very big difference.

*Ms. Moore. Thank you, and I yield back.

*Chairman Neal. Let me recognize the gentlelady from California, Ms. Chu, to inquire.

*Ms. Chu. Thank you, Chairman Neal and the committee, for holding this long-overdue hearing, the first Ways and Means hearing on climate change in 12 years.

Well, climate change is here, and it demands immediate action.

I would like to submit a statement for the record from the Citizens Climate Lobby, which lays out the economic case for taking bold action immediately, and offers a solution to aggressively address this crisis.

*Ms. Chu. This proposal offers a solution. In fact, it is a solution -- I support H.R. 763, which proposes something similar to what you, Mr. Halstead, was proposing, which is a

carbon fee where the dividends are returned to every American household. And so certainly I support such solutions, market-based solutions, that could help us in addressing this crisis.

Dr. Marvel, while the Federal Government has failed to adequately address this crisis, states are taking on bold initiatives and leading the way. My home state of California recently set targets of reducing emissions by 40 percent over 1990 levels by 2030, and achieving 100 percent carbon-free electricity by 2050. And locally, cities are adopting detailed climate action plans to achieve the goals.

For example, the City of Pasadena in my district released a climate action plan that directs the city to transition to electric buses, build more bike infrastructure, and design buildings and public spaces to better accommodate solar panels. LA Metro, which operates the country's second busiest bus network, will transition its entire fleet to electric buses by 2030.

Can you explain some of the real-world impacts we could expect if the U.S. followed California's lead and achieved those emission targets by 2030?

*Ms. Marvel. Thank you for the question. I am not surprised to see California taking a leadership role on this, because California is already feeling some of the impacts of climate change.

One of the things that I personally find most frightening is a projection in future precipitation swings, which means California is expected to experience wetter winters, so more

vegetation, and then hotter, drier summers, which means more fuel to burn, on top of projections in increased drought and increased downpours and rising temperatures.

So I am not at all surprised that California, which is really on the frontlines, is a leader. I think if the rest of the United States took similar action, we could have -- we could expend less energy on adaptation, which we are going to need, which is really important. But the more we mitigate, the less we have to adapt.

*Ms. Chu. Dr. Jha, Southern California expects drastic changes in living conditions and public health as a result of climate change. And that includes more severe heat waves and drought, more frequent fires, and more vector-borne diseases. The changes threaten lives, especially for minority communities. And, in fact, from 2006 to 2010 extreme heat caused more deaths each year in the U.S. than floods, storms, and lightning combined.

During a severe heat wave in 2006 California found that each 10-degree increase in temperature was associated with an estimated 9 percent increase in daily mortality rates. Temperatures hit a record 119 degrees in Los Angeles, 40 degrees above the average high temperature for that time.

When I was a state legislator in California I heard devastating stories of farm workers dying preventable deaths after working long hours in extreme heat. And that is why I passed a bill to get protections for outdoor workers in the State of California. But those stories will only become more common as

temperatures rise.

Can you explain the long and short-term health effects that outdoor workers experience by spending long hours in extreme heat?

*Mr. Jha. Yes. Thank you for your question, Congresswoman.

Look, human bodies are not designed to be in outside temperatures of 110, 115 degrees for any extended period of time. We just can't tolerate it, we can't adapt to it. There is no amount of getting used to it. It doesn't happen. And so this is one of the reasons why we see, for instance, farm workers have a mortality rate that is about 20 times higher than the average American worker in the United States.

I think the work that you led in California has been seminal in trying to improve that. But you are absolutely right, this is not the last we have seen of this issue.

The bottom line is when people are working outside -- and there are some jobs that are just going to require people to work outside: farm workers, construction workers, a whole series of individuals -- the short-term effects we know. There are dehydration, asthma, kidney failure. The long-term effects are much more pronounced. They are mental health issues, chronic kidney disease, exposure to vector-borne diseases, many of the things we have been talking about. These are going to have profound effects on health. They are going to be extremely expensive to take care of.

We have to do it for the health, not for the money, but the cost of all of that is going to be borne by this committee, and

by this country.

*Ms. Chu. Thank you. I yield back.

*Chairman Neal. I thank the gentlelady. Let me recognize the gentleman from Illinois, Mr. LaHood, to inquire.

*Mr. LaHood. Thank you, Mr. Chairman. I want to thank the witnesses for being here today.

Mr. Powell, I wanted to ask you a couple of questions related to nuclear energy. As you may know, my home state of Illinois is home to six nuclear power plants, supporting over 5,900 jobs there, and accounting for about -- over 50 percent of Illinois's electricity generation.

However, several of these plants have had difficulty operating at a productive level over the years, and I have tried to focus here with a number of my colleagues on a variety of policies to prevent the premature retirement of the existing nuclear fleet, including the bipartisan bill that I am a part of called the Nuclear Powers America Act.

Can you talk briefly about the climate impacts of premature nuclear power plant retirements, how important it is to preserve this fleet to our nation's emission reduction objectives?

*Mr. Powell. Absolutely. Well, first, Congressman LaHood, thank you for your leadership, both on preserving the existing nuclear fleet, and on scaling up new, innovative, clean technologies.

Preserving America's nuclear fleet is absolutely vital. So nuclear power is about 20 percent of American electricity. That 20 percent comprises about two-thirds of our zero-emission

energy. Nuclear power is definitively today the most important source of clean, zero-emission energy in the United States, and the most important part of our response to climate change. So finding ways to preserve that fleet is absolutely vital if we are at all serious about solving the climate challenge.

*Mr. LaHood. Thank you. And as you mentioned in your testimony, in some cases existing tax credits have had the unintended consequences of creating market distortions that needlessly distress baseload clean assets like existing nuclear power.

As we look to policy ideas focused on new generation -- and you referenced the bill that Mr. Reed and I have put forth, the Energy Sector Innovation Credit -- how should those policies be constructed to avoid these type of negative pricing events and consequences?

*Mr. Powell. Absolutely. Well, if you take a look at what we have done with the wind production tax credit, which, again, has been very helpful in bringing down the cost and scaling up wind energy, the unwanted side effect is that we pay wind to generate, regardless of whether the market wants that power or not. So an hour of wind generated in the middle of the night in the fall or the winter, when energy prices are already very low, or in fact even zero, the wind energy still generates. And because of that, it causes people to bid into the wholesale markets at negative power prices. Then other generators -- nuclear plants, for example -- that are optimal, just running all the time, are forced to actually have to pay for the privilege of

staying on the grid.

So in that instance, our tax policy has been sort of, you know, incoherent, from a climate perspective. We have paid one clean energy-generating source, and we are causing another clean energy-generating source to pay for the privilege of generating. So that is why we have got to get out of this market-distorting policy.

What I really appreciate about the proposal that you and Congressman Reed have put forward is you are proposing to pay out the credit, not based on how much someone generates, but how much the market pays for that generation. So it is paid out as a percentage of what the market compensates. So if the market really desires the power, and it wants it at \$100 a megawatt hour, it would pay out at, for example, 60 percent of that, or \$60 a megawatt hour. If the market doesn't want the power, and values it at zero dollars in that megawatt hour, the incentive would pay out at zero dollars in that megawatt hour. And I think that that is a much wiser way to do this, and to direct resources working with markets, as opposed to against them.

*Mr. LaHood. Thank you. Mr. Halstead, in my last minute here let me ask you a question. Nuclear is the nation's largest zero-carbon resource. Can you discuss the importance of nuclear to lowering carbon emissions, and how your plan would ensure all energy sources will play a role in addressing this issue?

*Mr. Halstead. Okay, Congressman. In solving our climate problem we need an all-hands-on-deck solution. And I agree with my colleague, Mr. Powell, about the importance of nuclear power

as a low-carbon -- actually, zero carbon -- technology. Nothing would drive nuclear power and other clean technologies more than a significant carbon price, because that would clearly benefit all low-carbon and no-carbon technologies, which is why companies such as Exelon, one of the nuclear leaders in this country, is a founding member of the Climate Leadership Council.

But a carbon price, to summarize, would help the nuclear industry and all zero-carbon-emission technologies.

*Mr. LaHood. Thank you. Those are all my questions.

*Ms. Sewell. [Presiding] The chair recognizes the gentleman from Michigan, Mr. Kildee.

*Mr. Kildee. Thank you, Madam Chair. And I thank the witnesses for being here. I wasn't sure who I was going to ask this question of, but since Dr. Jha mentioned my hometown of Flint, Michigan, you win.

I wonder if you could comment on a couple of things. One, I represent a big district, which includes Flint, but also includes 119 miles of Lake Huron shoreline. The Great Lakes are a natural -- a beautiful natural asset, but they are also fundamental to Michigan's economy. And so the effect of climate change is felt by us in real terms, whether it is harmful algal blooms or declining cold water fish. All of those effects have an effect on our economy.

So I completely align with the comments that have been made here, and even that have been made from some on the other side of the room about the need to align good climate policy with the fact that it is actually also good economic policy. We depend on

being able to stem the tide of climate change because our economy is absolutely dependent on the ecosystem of the Great Lakes.

Because transportation is so much a part of that economy, but also very much a part of the problem, one of the areas that, obviously, we need to target is emissions. And I am particularly focusing right now on emissions from vehicles. And I won't ask you to necessarily comment on any policy, although I have one, the Driving America Forward Act, which would continue to create incentives for automakers to invest in electric vehicles. I think that is an important step. But if you could just focus a bit, if you don't mind, on the negative health impacts from emissions from gasoline-powered vehicles.

And then I have another question that I would like to pose. So if you could just be concise, I would appreciate it.

*Mr. Jha. I will be very short, Congressman. The one broad point I want to make is that it turns out that human beings, like other animals, are part of an ecological system, right? And we have grown and adapted to that system. And so when we disrupt those ecological systems through climate change, not only do we harm the economy, not only do we harm the environment around us, we harm ourselves because our -- we have adapted to live in those environments, to eat certain types of foods, to drink certain types of water.

So it is always interesting to me that we try to take ourselves physically out of it and say we are doing this for the environment. It turns out, you know, this is not about environmental protection, it is about people protection.

On the issue of cars, I already mentioned that one in five kids diagnosed with asthma today, that the primary cause of it is emissions, and most of it is from cars. And it disproportionately affects certain communities in Alabama, in Michigan, in Houston. That is where we see the big effects. And so, anything we can do to reduce emissions from automobiles would be a win -- not anything, but generally reducing emissions from automobiles would be a win for kids of America.

*Mr. Kildee. Thank you. And one other question I would pose to you, because you also -- in one of the previous answers you offered -- got into another area that I spend a lot of time on, and that is the issue of urban design.

In Michigan, where I am from, we grow our land use eight times faster than our population. It is an unsustainable growth model. We are actually growing the footprint of the built environment, while not growing taxpayers to support all the services that are required. But one of the effects of that is to contribute to more consumption of carbon-based fuel, less efficient use of the land.

And I wonder if you might comment on the opportunity that presents itself, as this Congress is deliberating over infrastructure investment, to try to create an environment where we think about the environment as we are funding infrastructure, for example, that has the effect of pushing development very often into greenfields because the short-term cost of reinvestment in the existing built environment doesn't look good, as compared to the short-term impact cost of greenfield

development.

Can you just comment on that subject, because it is one that I think really needs to be part of the conversation, going forward.

*Mr. Jha. Let me comment very briefly, only to say that the global trend on this and the U.S. trend on this is very clear. People are moving to cities. We see that across the globe, and we see that in the U.S. And so when we think about infrastructure investments, the idea of getting to suburbs and exurbs and just building out further and further, it is not where the people are going.

And so we need to think about improving the life -- quality of life in cities, think about more green spaces, more trees, all of those things that are going to make cities more attractive because people are voting with their feet. And, of course, there are all sorts of environmental and health benefits of all of that investment.

So I think we really need to think about our infrastructure and our city planning as a major part of our strategy for improving health of the population.

*Mr. Kildee. Thank you. And I thank the whole panel. It was very, very interesting. And I yield back.

*Ms. Sewell. The chair recognizes the gentleman from Virginia, Mr. Beyer.

*Mr. Beyer. Thank you. I want to thank the chairman, Terri Sewell, for holding this hearing.

[Laughter.]

*Mr. Beyer. Yes, this is a first good step, and it is terrific. I served on the Science Committee the last four years, which was the heart of the climate change denial. So it is fun to be here with people that recognize that it is real. And I really think it is important for the Ways and Means Committee to provide leadership on the most important existential issue of our time.

I know these hearings can be a little dry, so I do recommend watching the recent John Oliver episode with Bill Nye the Science Guy. He also mentions my bill, which is the Healthy Family and Climate Security Act, in the show. So I am very fond of that show. This is the cap and dividend approach.

Mr. Halstead, I don't mean for this to be a hostile question, but this is potentially a hostile question. And I begin as a big fan of carbon pricing for many, many years. And I certainly agree with the Climate Leadership Council that the business community needs to be a necessary partner in any serious effort that we have. And we are really seeing that, as the whole American public comes to understand how important this is, that businesses want to be seen as legitimate partners in the solution. Not just be partners, but actually be seen to be partners in it.

And Members of Congress -- but we know what it is like, especially in the Ways and Means Committee, when the business community is invested in an issue, because they are knocking on our doors. I think my legislative director said he has 150 visits, just on tax extenders. They call it Gucci Gulch. But

the urgency isn't there on climate change from the business community, not even the mildest or most business friendly, are they coming to talk to us.

And we often see the robust business efforts in the opposite direction. Washington State -- so the supporters of the referendum were massively outspent, largely by the fossil fuel interests. That got beat because the fossil fuel companies were pouring -- BP, \$11.6 million alone. It was coordinated by a group called the Western States Petroleum Association, whose members include BP, ConocoPhillips, Exxon, Shell, all four of whom are energy-founding members of the Climate Leadership Conference.

Now, I don't know all the idiosyncrasies of the Washington State bill, but does the failure the Washington referendum make federal action more or less likely? Certainly less. People are going to be afraid of it. Had these companies ever put forth the kind of effort supporting climate solutions as they did opposing it? No. And I bet BP didn't give the Climate Leadership Council \$11.6 million. So please tell us how they are not using the CLC to greenwash, and how can you get them to actually be serious about carbon pricing, and come and knock on the doors of all 43 of us to make sure that we support a carbon pricing bill?

*Mr. Halstead. Thank you for the great question. I think we found that when environmentalists and industry -- or environmentalists in the fossil fuel industry -- are on the opposite side of an issue, it tends not to turn out well for the climate. And I think what is so significant about our effort is

they are behind the same plan.

Now let's get into why for a minute. It is not because carbon pricing by itself is the common denominator. It is a whole grand bargain in which you have, on the one hand, carbon pricing and the most ambitious carbon price that would ever be passed by this -- on a bipartisan basis -- \$40 per ton. That would exceed the U.S. Paris commitment. That is one part of the bargain.

The other part of the bargain is regulatory streamlining, because companies want a clear market signal, and they also want the predictability of being able to know where their laws will go in the future. So that grand bargain is essential, and also a grand bargain that enables the American people to come out ahead.

So yes, we believe that all members of our coalition are very sincere, and they are putting increasing resources -- not just their name, they are leaning in on policy design -- and increasingly energy company CEOs are meeting with legislators to promote this type of grand bargain.

*Mr. Beyer. Well, thank you. I am a big fan of the dividend approach, because it is progressive: 70 percent, 80 percent get more back. I would really encourage you to take your business corporate members and ask them to take their Washington lobbyists and visit all of us, because there is going to be a hesitancy on the part of our Ways and Means Committee and the general Congress to vote for something that is a fee, that could be characterized as a tax, that could put us at risk in the next election. And having the cover of the corporations will be

really, really essential.

Just one more quick thing. I was really disappointed with Secretary Pompeo's recent failed leadership at the Arctic Council, where he shunned a joint statement simply because it included the words "climate change.'" It was the first time a joint statement has ever been canceled since the creation of the Arctic Council, and just two little words. And I encourage my friends on the other side to bump up the Secretary of State and get him to be as strong a believer in climate change as they are now.

Mr. Chair -- Madam Chair, I yield back.

*Ms. Sewell. Thank you. The chair recognizes Dr. Wenstrup from Ohio.

*Mr. Wenstrup. Thank you, Madam Chair. I appreciate that. You know, as a doctor I served on Cincinnati's board of health for several years. You know, I fully get that environmental issues have a major role in the health of our citizens. And it is important to us to study trends, identify underlying causes, and go after them. From infant mortality to asthma, we have a lot of that in Cincinnati, and recognize the importance of that.

You might find this interesting, Doctor, as a VA physician. I am having a hard time getting a bill passed that would prohibit smoking in VA facilities. You may be aware of that. The law requires indoor smoking facilities available in the VA. You can help me out by talking that up a little bit, please, and maybe we can get that through this time. I tried last session, will try again.

And you know, I am saddened by the story with your Vietnam vet, and -- you know, and his situation. I am quite sure, with -- through his service, he was exposed to a lot of toxins. And the heat that day didn't help.

But I think back, too, when I was in Chicago about 20, 25 years ago at a Cubs game, and it was so hot. It was so hot that they were just having hoses going all day, just to hose you off while you were at the game. And sadly, that weekend 500 people in Chicago died. Five hundred people died from the heat. And that was really because of a brownout. You know, it was because of loss of air conditioning, or the inability to afford air conditioning. And really, they died from a loss of energy.

And in the winter it is the same thing. In my first year in Chicago it hit 29 below, and with windchill minus 60. So without energy people die, too. And so that is the balance we have to have here. Transition to cleaner, healthier, more efficient, and more affordable, because there is a great health care risk in that, as well. And so I think that needs to be a key part of the conversation. You know this is as a doctor, because without reliable, affordable energy, people die.

And I went to Puerto Rico after the hurricanes. Our VA stayed open. Miraculously, it stayed open through the entire thing, but not without many, many obstacles. And clearly, they ran on generator power. And what was even more intimidating for our veterans, especially -- and the veteran community did everything they could to get out to veterans that couldn't get into the hospital -- people on CPAP machines. And so what did

they need to bring into Puerto Rico? Generators.

So, as we have this discussion, and especially so much talk today about health care, you can't run a hospital, you can't save lives if you don't have energy. So that is why we have to be careful how we balance all this out. And I just, you know, would be curious if you have -- make a few comments on that, maybe help me reinforce this issue that we do things smartly as we move forward.

*Mr. Jha. So Congressman and Doctor, thank you for your comments. And there are several really important issues there.

First of all, I could have a long conversation about the smoking in VA facilities, and how much it drives me nuts. But that -- for another hearing.

*Mr. Wenstrup. If you will endorse my bill, thank you.

*Mr. Jha. I do, if that helps at all, Congressman. I am not sure it does, but I am -- I would vote for it if I were a Member of Congress.

You know, on the issue of energy, you are absolutely right. It is absolutely correct. I mean energy is the lifeblood of a hospital, of the health care system, of course, of our society. And we absolutely need reliable energy.

You know, on Puerto Rico, one of the more interesting things was that after the energy -- the system was really knocked out, the sun was shining. And places that had solar were actually able to continue to operate. And so it is a reminder that alternative energy can actually be quite useful at critical moments.

The broader point that I have tried to make, which I believe, based on the evidence and data, is that for most Americans, asking them to choose between polluting energy that causes asthma, heart disease, and stroke, or not having energy at all shouldn't be the set of choices we have. We actually have better choices.

*Mr. Wenstrup. I agree.

*Mr. Jha. And clean energy is good for our bodies, as you know. And I think it is good for our planet, as Dr. Marvel and others tell us. And I think we can get there. And I don't see that these two have to be a tension. Of course we have to be thoughtful and careful about how we do it.

*Mr. Wenstrup. And that is the point I am trying to make because, you know, there is a lot of conversation, and sometimes it is just being driven one way only, or one way or the other way.

And look, you know, I built a pole barn across the street. I put panels on the roof, and I got a battery, and, you know, I don't need to plug into the grid, right? I drive a hybrid. People are making those decisions. We are innovating. Let's keep that going, but let's not recognize the importance and not risk our energy grid. Thank you.

*Ms. Sewell. Thank you. The chair now recognizes Mr. Evans from Pennsylvania.

*Mr. Evans. Thank you, Madam Chair.

Mr. Wright, you raised the issue about the poor housing quality is worsening. And in your testimony you discuss the

strategy to build safer and stronger homes and businesses to improve safety and prevention of losses.

Can you please elaborate on this? And does this include public housing? And the reason I bring that to your attention is just yesterday I was at a location in my district, a organization called Project Homes, which is trying to address the issue of homelessness. And they have a quote: "No one has a home until everyone has a home.'" So I am interested in you elaborating.

*Mr. Wright. Yes, and I think that, as we have highlighted, those that are of lesser means are often put in -- closer to harm's way, and more susceptible, from a health perspective as well as from a housing perspective. And all too often, the way that the homes and structures that were constructed that many of them live in are most susceptible.

This is a place where the innovations are already in hand. We do know how to build those structures in a way by which they can withstand -- whether it is high wind, the approaches to flood, the other kinds of winter weather elements, and we have been able to demonstrate that, at the point of new construction, it basically costs about the same to construct it in a way by which they would be able to remain in their homes.

The more global piece on this, though, I look at is over and over again we see that -- we focus on, well, this damage occurred and this damage occurred. It is how it disrupts lives, and it changes the ability for them to go back to work and to continue to provide not just for their family, but feed into the economy that sits in that local community.

*Mr. Evans. But as -- sort of as a follow-up to that -- and I go back to the question about public housing -- I know there is market-rate housing and, obviously, public housing. And obviously, those citizens who are in there are susceptible to this whole issue. They have enough challenge about just having a home available.

So any thoughts relating to the question around public housing?

*Mr. Wright. I think, at its best, we have seen this -- HUD lay out some pathways. While they may not be actually driving people, they have opened up some alternatives. I have seen this play out in Houston after the events in the various ways. This has also played out in North Carolina after the recent events, where they are making clear that when they are putting public housing back in place after events, they need to do it in a way by which they will withstand what we know will be the inevitable next event.

*Mr. Evans. To the panel -- issue relating to climate change and labor productivity. I would like to open this up. Can anyone explain the impact of climate change on workers and what risks if we don't act on this? Someone in the panel?

*Mr. Jha. So, I am -- as you know, Congressman, that is a very important question. I am not a labor economist, I am not a labor specialist. I am a doctor and a public health person. But as I mentioned earlier, when speaking about -- to Congresswoman Chu about farm workers, I think there is actually -- I have seen very good evidence -- and I just don't have it off the top of my

head -- about broad effects on worker productivity, and negative effects of climate change and heat waves.

And certainly, from a health effect, I mean, we know that the human body can't deal with temperatures into the 90s and 100s for an extended period of time. We have seen effects on cognition, we have seen effects on stamina. There are health effects. It stands to reason there are going to be large productivity impacts of all of that, as well.

So I think there is very good evidence behind this. I wish I were more facile with that evidence. But I think it is pretty clear.

*Mr. Halstead. I would be glad to answer that, as well. The founding members of our Coalition, the corporate founding members, have over 2.2 million employees. It is very clear to them and to us that a climate solution should not only be pro-environment, but also pro-jobs. And what is holding back American companies from investing more in clean energy is the lack of certainty, the lack of flexibility, the lack of incentives.

We believe that a price on carbon, combined with regulatory simplification, will drive not only greater environmental ambition, but far more jobs -- to speak to your point, Mr. Evans.

*Mr. Powell. I don't think I have anything to add. I would agree there will be significant impacts on labor productivity from extreme climate change, and we ought to be taking the issue very seriously.

*Mr. Evans. I yield back the balance of my time. Thank

you, Madam Chair.

*Ms. Sewell. They have just called votes, but we are going to see if we can finish on time. So I want to remind both the witnesses and the members that when it is yellow, wrap it up so that we can get -- be as efficient as we possibly can.

The chair now recognizes Mr. Schneider.

*Mr. Schneider. Thank you, Madam Chairman. And I want to thank the witnesses for sharing your perspectives today and your patience with us.

Last Monday the United Nations issued a report. It was the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services report that indicated that, potentially, more than a million species are threatened with extinction. They summarize that 40 percent of all amphibians, 33 percent of reef forming corals, a third of all marine animals are threatened by climate change. But, as dire as that is, Dr. Marvel, you used the words "we are not doomed."

And I want to just quote from the presentation Dr. Robert -- or Sir Robert Watson, the IPBES chair, said in his summary last week, "The report also tells us that it is not too late to make a difference, but only if we start now at every level, from local to global," he said. "Through transformative change, nature can still be conserved, restored, and used sustainably. This is also a key to meeting most other global goals. But transformative change, we mean a fundamental, system-wide reorganization across technological, economic, and social factors, including paradigms, goals, and values." I think this lays out the challenge ahead

of us.

With permission I would like to include a summary for policymakers of the advanced version.

*Ms. Sewell. So ordered.

[The information follows:]

*Mr. Schneider. Thank you very much.

And my colleague from Michigan mentioned the effects of climate change on the Great Lakes. I represent a district in Illinois, the largest part of Illinois that is on the Great Lakes. The Great Lakes is touched by five lakes. It is eight states, two nations. Thirty-four million people live within the Great Lakes Basin. It makes it one of the largest regional economies in the entire world.

But it is profoundly affected by climate change. Air temperature runoff, exacerbated by heavy rains and flooding, the lake ecology -- the water quality is affected by climate change, the shipping and commerce.

Again, with permission, I would like to submit an assessment of the impacts of climate change from the Environmental Law and Policy Center.

*Ms. Sewell. Yes.

*Mr. Schneider. Thank you.

*Ms. Sewell. So ordered.

[\[The information follows:\]](#)

*Mr. Schneider. Thank you. And with that, I would like to turn to Mr. Wright.

In your testimony you have touched on and focused primarily on the impact on private property, commercial property, the need to build resiliency. But I would like to get your thoughts on public property infrastructure.

In my district we have a harbor along Lake Michigan. We have a commuter rail with -- a few years ago we had a bridge collapse in the heat. We have roads that are consistently being stressed by the extremes of temperatures. What impact are we seeing, and how do we build resiliency into our infrastructure? What are the costs going to be of that?

*Mr. Wright. Well, I think one of the fundamentals about infrastructure is -- you can focus structure by structure. You then deal with the fact that it affects an entire community or neighborhood that is in place.

I think the best news is most of the time infrastructure is built at a point by which it has a useful life of at least 50 years. And I do think the right decisions are being made, related to what those look like going forward.

The problem is we have got antiquated infrastructure in place today well beyond its useful life. That comes with an incredible price tag related to what does it mean to put it back.

We have the right approaches, in terms of what it looks like to build it. The question is going to turn into a financing of that, going forward.

*Mr. Schneider. But just to emphasize that, our regional

commuter rail has 840 bridges. Life expectancy is 75 to 100 years. Four hundred of those bridges are more than a hundred years old.

*Mr. Wright. More than 100 years --

*Mr. Schneider. That is a perfect example. But again, talking about more globally, and looking at past hurricane damage, it is estimated that in 2005 50 percent of the cost of those hurricanes was borne by federal aid, or covered by federal aid. By 2008 that number had grown to more than 69 percent. And in 2012 it was over 75 percent.

Who is absorbing these costs -- I will open it up to the panel -- of climate change, as greater intensity of storms, more impact on homes, businesses, and infrastructure is taking place?

*Mr. Wright. Well, having spent an incredible number of years at FEMA, what I will tell you is, through the work of Congress, you all are helping use the American people to pay those bills.

*Mr. Schneider. The American taxpayers.

*Mr. Wright. The taxpayers that are coming in. And I think that is a point where we have to lean forward in ways by which we bend down that risk curve. Yes, we have got to do the broader piece that is here. But for what is built, bend down the risk curve. And then, secondly, find ways so that more private dollars are being funneled into that innovation, rather than just tax.

*Mr. Schneider. And in my last 10 seconds let me just emphasize something else you said, Mr. Wright. Every dollar we

invest in resiliency -- and that --

*Mr. Wright. Pays back six.

*Mr. Schneider. Planning for the future pays back six to one. This is an ounce of prevention is worth a pound of cure. Again, thank you to the witnesses. I yield back.

*Ms. Sewell. The chair now recognizes Mr. Arrington from Texas.

*Mr. Arrington. Thank you, Madam Chair. I want to continue on the analogy one of my colleagues mentioned earlier about a patient who was told by their doctor that they are sick, and wouldn't we have that sense of urgency to address it. And wouldn't we think it is serious, and wouldn't we be, you know, aggressive in that.

I think my response to that, first, is who is the doctor, and are they providing an accurate diagnosis? Wouldn't you agree, Doctor, that is critical? And that they would prescribe the right therapy. And so I think those are the questions that come to mind when somebody presents that medical analogy.

You know, I looked up conditions similar to cancer, and one came up with regard to stomach cancer. It said that peptic ulcers and acid reflux can have the same -- can look symptomatically the same as somebody with stomach cancer. We would both agree that they are radically different, in terms of the true diagnosis and treatment.

So I think it is critical that we don't start pumping the body full of poison -- i.e. chemotherapy -- to save a patient that may have peptic ulcers, may have acid reflux. And that is

kind of my thought to that analogy.

Now, if you had cancer, I think the other thing you would want to know is what is the best therapy. Now, we have seen an expansion -- maybe, I would say, even explosion in therapy, medical therapy, innovation, and technology. Immunotherapy is changing how we approach a lot of disease states, including cancer. We can turn on somebody's immune system to actually attack the cancer cells, where there is far less side effects than radiation and chemotherapy. Would you agree with that, Doctor?

*Mr. Jha. So absolutely.

*Mr. Arrington. And so using the biologics and the immunotherapies might not only be the most efficacious way, it might present the patient with far fewer and -- side effects. So I think that is the framework I have approaching this.

Let me go to questions. I don't -- I won't bore you with my philosophical approach, other than, like Mr. Lewis, I am for clean air and clean water. I think it is a stewardship responsibility to my Creator and to my children. I think that we have a public good, responsibility -- I don't -- people use "rights." They throw that around a little too flippantly for me, so I would probably change that word. I respect Mr. Lewis, what a gentleman, what a great man and leader, but no, I don't -- I think we have a responsibility, tremendous, to make sure our children have cleaner air, cleaner water. And I think the Clean Air Act pretty definitively, and in a very measurable way, listed six driving pollutants to a better quality of our environment.

And so we have stewarded them pretty well, because I think U.S. has reduced those pollutants at a more rapid rate, more significantly than any country in the world -- in the world. So in many ways it is working the current framework, and in many ways -- not just in many ways -- we are leading.

In fact, I have got a stat here that is pretty remarkable. From 2005 to 2017 U.S. energy-related emissions fell by 14 percent here in the U.S., when the rest of the world increased their emissions by 20 percent. But in 1970, just clean air, the United States has reduced six key pollutants, carbon monoxide and some of the others that are listed in the Clean Air Act, reduced them by 73 percent, while we grew our economy by 230 percent.

Would you all agree that you got to strike the balance? We have got to steward the environment, but we have to make sure we still have this land of opportunity for our children, we continue to grow, and we don't have a significant and adverse impact to our jobs. Would you all just nod your heads?

Dr. Marvel, would you agree with that balance? And I am not trying -- asking you to calculate it, but that there is a balance, and the Clean Air Act articulates that?

*Ms. Marvel. The Clean Air Act was very successful at reducing certain types of pollutants. I agree with that.

*Mr. Arrington. Do you -- the leading policy proposal from my colleagues -- not all of them endorse it, but by -- most of my colleagues on the Democrat side have this new green -- Green New Deal. Have -- I am sure you are familiar with it. Do you think that that is a good solution to what we are attempting to

address?

*Ms. Marvel. Sir, it is my job to tell you what carbon dioxide does when it gets into the atmosphere.

*Mr. Arrington. But do you -- you have read it. Do you support it? Do you support it as a reasonable solution to reducing our carbon footprint and having a cleaner environment?

*Ms. Marvel. I don't think my expertise leads me --

*Mr. Arrington. I think you want to stay away from it, like a 100 foot pole away from it. And I think every one of you do, because it is absolutely way too much of an overreach, and would do -- and would not just do harm, it would devastate the economy.

Let's find balanced ways, Madam Chair, to address this together in a bipartisan way. We can do it, and we can still feed and clothe the American people and fuel this economy.

*Ms. Sewell. Thank you. The chair will recognize Mr. Suozzi. But before she does, I want to just remind everybody that we are going to go to votes after Mr. Suozzi's testimony. We have two votes. We will give the witnesses a chance to take a breather, but we will come immediately back here to start up again after votes. So there are two votes. And now the chair recognizes Mr. Suozzi for five minutes.

*Mr. Suozzi. Thank you very much, Madam Chair. I want to thank the witnesses. You have had a long day here today. We really appreciate all the time that you have put in, and the preparation you did to get prepared here for today.

I believe that climate change is real. I am excited to hear some of my colleagues are talking more that they believe that

climate change is real. We had a hearing here a few months ago, where they talked about -- that they believe we need to protect preexisting conditions. So politics sometimes works. You can persuade people that -- what the right answer is, what the truth is. And the fact that people are recognizing on the other side that climate change is real is a big step forward.

A lot of people in the world are recognizing that climate change is real. The Pentagon is now required, pursuant to the National Defense Authorization Act, to consider climate change when looking at our bases, when looking at droughts, future conflicts. Businesses are doing that. We heard earlier about the pharmaceutical companies are looking to make money off of the effects of climate change, and the effects on asthma and other diseases. Construction industries are preparing for it. Mr. Wright talks about all the different issues that insurance companies are preparing for. A lot of people are preparing for the reality of climate change.

So we have made big progress. It sounds like the Baker-Shultz Carbon Dividends Plan that Mr. Halstead is talking about has a lot of support from a lot of different quarters. And I have talked to some of my colleagues and they say, "Well, I don't have a problem with that, but I don't like the idea that it is all going to dividends. I would like to see some of it spent on innovation, and I would like to see some of it spent on infrastructure, and some of it on other things."

I want to ask each of the witnesses, including you, Mr. Powell. Do you support the Baker-Shultz Carbon Dividends Plan,

or do you -- I want to get something done. I think climate change is real, and we have to do something and get moving on it right away. And I am -- I support the Green New Deal. I support any plan to try and do something to get something done. But I want to know what can get done.

Mr. Powell, do you support the Baker-Shultz Plan?

*Mr. Powell. I do not.

*Mr. Suozzi. And is -- what is the reason you don't support it?

*Mr. Powell. First, I don't think that it is a politically realistic plan. I think that we have seen much more bipartisan support for carrot-based --

*Mr. Suozzi. What do you think stops Republicans from supporting this plan?

*Mr. Powell. Well, I think that it focuses on making traditional energy more expensive, rather than clean energy cheaper.

*Mr. Suozzi. Mr. Halstead, we know you support the plan, obviously. Would you consider supporting some amendments to it to have the money that is generated from it invested in other ways, or do you only want to see it going to dividends?

*Mr. Halstead. Our coalition believes that the best use would be dividends, because that makes it equitable and popular with the American public, which, of course, is essential for a bipartisan plan to pass.

*Mr. Suozzi. Mr. Wright, how do you feel about this plan?

*Mr. Wright. Climate mitigation is not my area of

expertise, but I would say anything that anything that moves forward in a bipartisan way is a good path forward.

*Mr. Suozzi. Dr. Jha?

*Mr. Jha. Also not my area of expertise, Congressman. But as I said in my opening testimony, anything that reduces our reliance on fossil fuels is good for America's health, and I would be supportive of that.

*Mr. Suozzi. Dr. Marvel, I know that you only talk about what carbon dioxide does when it affects the atmosphere. But do you have any feelings about this particular plan?

*Ms. Marvel. If it can draw down carbon dioxide to the level that we require in order to stay under the warming threshold set by the Paris Agreement, 1.5 or 2 degrees Celsius, I would personally support it (the witness would like to note that NASA and Columbia University do not make policy endorsements).

*Mr. Suozzi. Mr. Powell, to accomplish Dr. Marvel's objective, and the objective of many people that would like to see us prevent this from happening, what would you propose in an alternative -- separate and apart from the Baker-Shultz Carbon Dividends Plan?

*Mr. Powell. If we look at the reality of climate change, unfortunately, one molecule of CO2 produced here in the United States has precisely the same effect --

*Mr. Suozzi. We want to focus on what the -- we can control within our own borders, with the United States. And I understand that China is not doing a good job, and India is not doing a good job, and all these people are not doing good jobs. But we want

to do something here in America, as Americans. You are an American citizen, right?

*Mr. Powell. I am.

*Mr. Suozzi. So we want to do what we can in America. What would you support to try and reduce the carbon footprint in the United States of America? You -- because you do believe climate change is real.

*Mr. Powell. I do.

*Mr. Suozzi. And you believe that it is affected by human activity?

*Mr. Powell. Indeed.

*Mr. Suozzi. So what would you like to do to try and reduce

--

*Mr. Powell. Radically reducing the price of clean energy technologies, both which will help us reduce our emissions here at home, and so that we can sell those technologies --

*Mr. Suozzi. You think that it is necessary for government investment in order to reduce -- radically reduce the cost of clean energy in America?

*Mr. Powell. Absolutely. It always has been.

*Mr. Suozzi. Where would you like to see that money come from?

*Mr. Powell. The Federal Government Department of Energy, in association with the private sector.

*Mr. Suozzi. Where would where would the Federal Government get the money from?

*Mr. Powell. The appropriations process and taxpayers.

*Mr. Suozzi. Okay, so then we would have to raise taxes, you are suggesting?

*Mr. Powell. Well, every year we already spend 5 to \$6 billion a year through the Department of Energy and our --

*Mr. Suozzi. We have a massive deficit. So to do new things, like an infrastructure plan in America, we have to generate new revenues. Where would you generate revenues? If you don't like the Baker-Shultz carbon dividend idea, or a carbon tax to generate the money, where else could we generate -- or do you like the idea of a carbon tax, just not this plan?

*Mr. Powell. No.

*Mr. Suozzi. Do you like any plan to generate new revenues to try and reduce the cost of clean energy in America?

*Mr. Powell. I think that there have been interesting proposals in the past to find dedicated revenue streams for energy innovation.

*Mr. Suozzi. Like what? I have 10 seconds left.

*Mr. Powell. If you look at the past reports, for example, of the American Energy Innovation Council that Bill Gates and Jeff Immelt led.

*Mr. Suozzi. Okay, thank you very much, everybody. I really appreciate your time and effort on this very important topic that is so essential to the future of the world. Thank you.

*Ms. Sewell. And we will break for votes, and our members will come immediately back so that we can reassemble after votes.

We adjourn, subject to the chair. This committee stands in

recess, subject to the call of the chair.

[Recess.]

*Ms. Sewell. The committee will come to order. The Chair recognizes Mr. Panetta from California for five minutes.

*Mr. Panetta. Thank you, Madam Chair. I appreciate this opportunity.

Gentlemen and Dr. Marvel, when she gets back, I just wanted to say thank you for your testimony, as well as your preparation in order for you to testify. I know a lot went into this, especially reading your written testimony and then hearing you today. So thank you very much.

Once again, Jimmy Panetta. I am from the Central Coast of California. Obviously, low on the totem pole here on the Ways and Means, so, you know, that is what happens. Not many people sticking around for my questions, and then my questions are probably repetitive, which they are going to be, considering a lot of people have asked some pretty good questions and you gave some really substantive answers. So I appreciate it.

But I do want to hear about a couple things, and I am going to focus on Dr. Jha for the first question, and then you two over here for the second question -- sorry, Mr. Wright.

Dr. Jha, like I said, I come from Central Coast. It is also known -- and my colleagues get sick and tired of me saying this -- as the salad bowl of the world, one of the most productive areas when it comes to soft fruits and vegetables. And -- but it is also one of the most vulnerable when it comes to climate change. And obviously, you know, we have heard a lot about farm

workers, and -- which is understandable. And they -- you know, what happens to them, what can happen to them when they are subject to a lot of the things that go into agriculture.

But also I hear from the farmers, as well. And they are worried about what you heard some of my colleagues talk about, their industry getting wiped out. Just a general question to you. How can government work with the agriculture community to ensure both the sustainability and the continued health of our food supply?

*Mr. Jha. It is a fundamentally important question, Congressman, because an effective food supply, a plentiful food supply, is critical to the nutrition and the health needs of our nation.

So what we know from climate change is that climate change -- and Dr. Marvel over here, she would, you know, attest to this, that the effects of precipitation, the heat effect, all really do threaten the food supply of our country. And so it is, obviously, critically important that we begin to address fundamental underlying issues of climate change, burning of fossil fuels, and the air pollution that comes along.

But we also have to, I think, strengthen our food supply much more broadly. One of the things that we have seen in major storms and other things is the impact on supply chain. So you can have great production, but that food can rot because you can't get it to the places that you need. That is a place where I think the government can play a helpful role.

Obviously, the government has had a very substantial public

health footprint, in terms of ensuring the safety of the food supply. We think that role is going to have to get bigger. CDC is going to have to pay more attention. Every expectation I have is that food-borne illnesses are going to rise. And we need to ensure that Americans still have confidence in the food that they eat, and that is going to require CDC, FDA, as well as the farmers themselves.

*Mr. Panetta. Exactly. And I wanted to just stress that last part. Don't you feel that farmers, producers should be at the table when it comes to these types of discussions, as well, no matter what policy is put in place?

*Mr. Jha. Oh, absolutely. Any policy that does not incorporate the people who are going to be most affected by it tends to be not very good policy.

*Mr. Panetta. Perfect. Thank you, Dr. Jha.

Mr. Halstead and Mr. Powell, you know, I think Mr. Suozzi -- I had my question right here, and I guarantee you he took it. He is my roommate. He is known to do things like that. But I want to talk to you about the answer or the lack of answer you gave to another good friend of mine, Mr. Larson up there, when he asked about the compromise that needs to be had as to where that dividend goes.

Now, trust me, I got the Citizens Climate Lobby banging on me in my office pretty much every month, which I appreciate because we have good, fruitful discussions -- and where the dividend should go. And what I have told them is that I do believe that, although some of the dividend could go to American

families, I believe that we can affect not just American families, but we can affect this country if we continue to invest in our technology dealing with carbon output.

And so once again, I want to ask both of you, is there room for you to compromise on this issue, Mr. Powell?

*Mr. Halstead. Thank you for the question sir.

*Mr. Panetta. Mr. Powell?

*Mr. Halstead. Sorry?

*Mr. Panetta. Mr. Powell.

*Mr. Halstead. Oh, I am sorry. Please.

*Mr. Powell. Well, so first, let me just say thank you for your leadership on clean innovation technologies, and particularly advanced low-emitting fossil fuel systems. I know that that is a particular area of interest of yours, and we think that those technologies are a very interesting part of the solution here.

*Mr. Panetta. Thank you.

*Mr. Powell. I would come back to the -- just the premise of that question, which is that the funding stream would need to come from a carbon pricing proposal. I think that there are many other potential funding streams for scaling up clean innovative technologies, including just our standard appropriations process, and that we could be getting a lot more out of the dollars we already spend on clean energy R&D if it was better focused and targeted through appropriations and through the work of your colleagues on the Energy and Commerce Committee.

*Mr. Panetta. Thank you.

Mr. Halstead?

*Mr. Halstead. Thank you. I think there is broad-based consensus within the business community that this is the best plan. Why? Because they want their customers to come out ahead. The dividend is the only solution that is popular with the American public and will enable the vast majority of American families to win under a carbon pricing scenario.

*Mr. Panetta. And what I tell my constituents at CLC, and what I will tell you, I hope that we continue to make sure that there is some sort of compromise as to where that dividend goes to, because I think that is best for America.

Thank you both. Thanks to all of you.

*Mr. Powell. Thank you.

*Mr. Panetta. Thank you, Madam Chair. I yield back.

*Ms. Sewell. I want to remind the witnesses, as well as the committee members, that when the yellow light is yellow you have one minute. Please start wrapping up so that we can end this hearing on time -- beyond time.

The chair now recognizes the gentleman from Kansas, Mr. Estes.

*Mr. Estes. Thank you, Madam Chair, and thank you to all the panelists for going through this long process, and allowing us the opportunity to vote in between.

You know, as we meet today our economy is going great strides, from the standpoint of, you know, unemployment is at a 50-year low, wages are increasing the fastest in 10 years, and we have more job openings than job seekers. And, you know, that

incredible turnaround has been, for the large part, by the hard work that we did going through with tax cuts and regulatory reform, trying to help focus on helping make those initiatives that we value move forward.

But I think -- and I think we can use some of that same logic, some of that same approach addressing some of the issues we talk about, the environment and the climate.

You know as a Kansan -- I mean Wichita is known as the Air Capital of the World. We do a lot of aerospace development, but also have a lot of agriculture within my district, as well, and throughout the state. And I can tell you that there is no better stewards of the land and the environment than the farmers and ranchers, because not only is that their livelihood, but that is also what they want to leave to their children and grandchildren as their legacy.

So, you know, as we look at how can we move forward from here, how can we look at innovation, how can we look at regulatory changes to help make sure that we get the best practices for our climate.

For too many years, you know, the Democrat approach to climate change has been, you know, how do we put in implementation ideas that actually would make energy more expensive. And now, with the new policies around the Green New Deal proposal, obviously that is going to add trillions of dollars in cost in that process.

And instead, I think we need to look at more clean energy opportunities. I talked about this in an op ed that was

published in The Hill this week. You know that America can't be alone in solving this problem. For example, the Paris climate accord would have restricted and greatly added to the cost and the burdens on American individuals and American companies without putting limits on China and India, who actually are putting more carbon into the environment now.

So we want to make sure that we don't implement a policy like some of the proposals in the Green New Deal that cost the \$93 trillion -- actually, it would take Treasury over 400 years to print that much money. And it affects every family to the tune of about \$65,000 a year.

So let's look at what do we do. You know, U.S. emissions have been relatively flat since the 1990s, while these emissions from China and India have skyrocketed. And I think what we need to look at is what kind of practices we can put in place, what kind of policies can we put in place to help export some of our innovation, some of the things we have done, to some of these other countries.

Mr. Powell, you know, one of the things -- I guess what I would like to talk a little about is what do you think are some of the best ways to reduce carbon emissions, and what should we do, from a market standpoint, to increase and make energy more efficient, as opposed to some of the government-mandated things?

*Mr. Powell. Sure. Well, first, thank you for your fortitude and hanging on to the end of this fourth hour of this, and thank you all for that.

You know, you mentioned exports of our technologies, which I

think is a critical part of this conversation that we haven't discussed much today. Ranking Leader Brady discussed his proposal to make sure that there are no outgoing tariff barriers on these technologies going to other countries, and I think that that is very important.

I would also note that you all passed the BUILD Act last year, which establishes a new \$60 billion authority under the Development Finance Corporation which will evolve from the OPEC currently, and that authority could be an enormous tool for taking and deploying American clean energy technologies all across the developing world. That is good for our national security because some of that could be technologies that are highly sensitive that we want to control around the world. That is great for our sort of global economic diplomacy. And it is great for emissions and energy access in a clean way around the developing world, which would also help global public health.

*Mr. Estes. That is that is actually great. I think when we look at different options -- I mean one of the things I was able to see a couple of weeks ago, one of the companies that operates in my district, Occidental, is a partnership -- and a plan to develop a new electric generation facility that actually produces as much energy, but also captures the CO2 in the production process so it doesn't have to be scrubbed out. And actually, it becomes usable CO2 that they can actually then use to inject into the ground, and either use oil fields or that.

You know, one of the things, you know, as we talk about some of that carbon capturing, can you talk a little bit, Mr. Powell,

about the global carbon emissions from -- how that carbon capturing helps?

*Mr. Powell. Absolutely. I recognize I am in the yellow. There is no more exciting technology in the world, I think, than the net power technology which Occidental has invested in. Representative Schweikert showed a picture of that. It is a zero-emission natural gas power plant which would be highly flexible, and no more expensive than a traditional natural gas power plant.

*Mr. Estes. Thank you, and I yield back.

*Ms. Sewell. The chair now recognizes Mrs. Murphy from Florida.

*Mrs. Murphy. Thank you, Madam Chair, and thank you to all the witnesses for your testimony.

I live in Florida, and climate change is an existential threat to my home state. We are experiencing the consequences of climate change on a daily basis, whether that sunny day flooding, or hurricanes that are so strong that they defy categorization, harmful algae blooms that are contaminating our water supply and hurting our tourism.

You know, our coastal economics face significant economic peril and countless lives are at risk. And I believe that a crisis of this scale deserves honest conversation, bold ideas, and, most importantly, action. But I think we need two things from our colleagues in order to get there.

And for my Republican colleagues, they have a moral responsibility to listen to the facts and to stand up to those in

their party who deny the science. You know, we can disagree on the policy approach, but we should be able to legislate from a place of fact. And, as -- and we, as Democrats, we have a political responsibility in a divided government to seek bipartisan progress that moves us forward. And that means being open to ideas and proposals, regardless of the political affiliation of the source.

So I thank Representative Smith for requesting, and the chair for entering into the record, the testimony -- would have been testimony -- of former Representative Curbelo. He is a fellow Floridian who understands these issues well, is a former colleague who has worked on them, and currently holds, I think, the most important title in a democracy, and that is of citizen.

I think climate change is real. Climate change is destructive. And the time for Congress to do something is now. Dr. Marvel, if we don't take any action, and you look at a state, a coastal state like Florida, can you paint me a picture of what Florida will look like, say, in 20 years for my kids and my constituents?

*Ms. Marvel. So a lot of times when people think about sea level rise, they think of something gradual and easy to run away from. But, as I am sure you know, one of the scariest things about sea level rise is what it does to storm surges. When the seas are higher, storm surges can reach farther inland and become more destructive.

And we know, as has been mentioned by several members of this committee, that climate change happens in the world that we

make for it.

It affects everybody, but it doesn't affect everybody equally. We have good reason to believe climate change will exacerbate existing inequalities and contribute to existing justice issues.

*Mrs. Murphy. Thank you. And Mr. Powell, you know, having heard through this hearing about the severity of the issue, and sort of the timing that we have, do you think that industry is currently innovating quickly enough, in that developing countries are adapting on a purely economic motive quickly enough to have an impact in a timely manner, given the urgency of the threat?

*Mr. Powell. Absolutely not. Neither are we innovating quickly enough, nor are we adapting quickly enough, given the severity of the threat. We need to accelerate both.

*Mrs. Murphy. And how would you suggest we accelerate both?

*Mr. Powell. The simplest and easiest way to accelerate both is to make the things that people can use to move more quickly more affordable and faster moving. As soon as we had shale gas in the United States, a lower-emitting, better-performing, cheaper alternative to traditional coal, the market took that up at an incredible pace, far faster than it took up intermittent wind and solar. Now those are terrific technologies, but they are neither as cheap nor as high performing as shale gas.

If we simply found something else like shale gas that was zero emission, and cheap, and high performing, like a zero-emission natural gas power plant, or an incredible new storage

system to connect to renewables, or an advanced nuclear reactor, I would expect we could really accelerate how markets are taking up the technology around the world.

*Mrs. Murphy. Do you think government has a role in incentivizing businesses to investigate those technologies?

*Mr. Powell. Absolutely. I think the only way that this has ever happened is in public-private partnerships.

*Mrs. Murphy. Thank you. And Mr. Wright, just shifting a little bit, you talked a little bit about adaptations as taking action today to reduce losses tomorrow. Do you think families -- you know, they say that families in America, one in four can't afford a \$400, you know, tire blow-out. Do you think working families can afford the adaptations necessary to reduce the risks that they are facing?

*Mr. Wright. There are some elements that are within reach and some that are beyond. You know, you look at the kind of impact -- even something like Irma had, running through your district, where it was those roofs that were blown off. In many ways Tampa fared okay, and the center of the state was then hit there.

On -- as we do with roofs, there are things that people can do for a few hundred dollars to a couple of thousands of dollars. And while that is not accessible to everyone, it is accessible to some. But other strategies, particularly as we deal with flood, deal with very high prices, in terms of what it means to elevate.

*Mrs. Murphy. Great, thank you. And I yield back.

*Ms. Sewell. The chair recognizes Mr. Gomez from

California.

*Mr. Gomez. Thank you so much.

There is a buzz word that people are using here, and it is "innovation.'" And I call it a buzz word, because often times, when it comes to the issue of climate change and combating climate change, people said, "You know what? Just let the private sector innovate, and it will solve everything.'"

But that is not how it works. You know, I come from California, where we have been dealing with different issues when it came to pollution and climate change for decades. And it was often times trying to address the particular need. The need is often, you know, let's make sure that we are not killing our own citizens with bad air or bad water. That need leads to goals. Those goals are then codified in the legislation. And then the legislation often spurs the innovation that is necessary in the private sector to achieve the goals, right, and achieve those needs. And yes, that leads to adaptation and job creation.

But innovation just doesn't occur with the snap of a finger. It is often government setting the standard. In California we had, you know, some of the worst air quality in the country. We still do, but at least we don't have 125 red-flag days where children can't go outside and play, where you had motorcycle cops once upon a time that would wear gas masks so they wouldn't drive in the pollution, right? We actually took steps, but those steps -- the small story when it comes to the tailpipe emissions standards -- led to the check engine light, to the catalytic converter, led to so much innovation that people don't even

recognize that it started by trying to protect people's health, right?

And that is where we are when it comes to, I think -- when it comes to combating climate change. We first need to recognize that there is a need. That need needs to be addressed, because it is impacting people's health, it is impacting people's lives, it is impacting people's jobs, right? And that is where we need to start focusing.

This committee -- it is great to hear that some of my Republican colleagues believe that there is a need. There is a disagreement on how to get there, but the entire Republican caucus still isn't there. And in order to come up with those legislative ideas it is important.

California, we have done a lot of things well. But one of the things that we learned is that if we don't take the most disadvantaged communities into account -- you know, the ones that are disproportionately impacted by climate change and pollution -- then they will be left behind. You will have a great -- a green divide that gets exacerbated. And we started combating that in California, really, to deal with seniors, immigrants, children, low-income families across the state.

Mr. Jha, I wanted to ask you, when it comes to health care and these disadvantaged communities, what are some of the prime negative impacts you are seeing on climate change on these families?

And Mr. Wright, how can we adapt some of those strategies to help them?

*Mr. Jha. So, Congressman Gomez, a really important question, and I would say a couple of things.

You know, one of the issues that were brought -- was brought up earlier, as you know, if you think of this as a medical condition, you try to sort out -- is this peptic ulcer disease, is this stomach cancer?

Here is where we are, if we think about climate change today. We have a population that is at substantial risk. And while I am happy to wait for innovation, I am happy to have innovation, I can't -- we can't wait for it. We have got to start acting now. And that, to me, is the most important point of the day, is that innovation is going to be important, but there is a lot of things we can do today that will disproportionately benefit under-represented, under-served communities, because they are the ones who are being hurt the most right now by climate change.

If you think about where the air pollution is that comes from burning fossil fuels, and who is really being affected by it, it is communities of color, it is people living in poor areas. So there is both a racial component and an economic justice component. And the effects are all the ones we have talked about: asthma, heart disease, exposure to new diseases. And they have a profound effect on people's lives, and that really does require action.

*Mr. Gomez. Mr. Wright?

*Mr. Wright. And then I would look at the economic impacts. You look at the Woolsey Fire and other -- those that were in the

vicinity of your district, and you look at what are we going to do, because we saw those fires generated by some of these same kind of conditions that were not just sitting right at the edge with the people who live in the homes that have the fancy backyards, but the track homes in the middle. As we saw those embers move into the communities, there are very tangible things that we can do for a few hundred dollars or less to help those structures, make sure that they are not going to lose their home, that they are going to have a place to go after that fire comes through.

*Mr. Gomez. No, and I agree. And one of the things that I don't want to see is that these disadvantaged communities are left behind. Because climate change doesn't discriminate if you live in a Republican district or Democratic district.

So I yield back, and I thank you for your time.

*Ms. Sewell. The chair now recognizes the gentleman from Nevada, Mr. Horsford, for five minutes.

*Mr. Horsford. Thank you very much, Madam Chair. And thank you to Chairman Neal for hosting the first hearing on climate change in the Ways and Means Committee in nearly 12 years. Our leadership is serious about addressing this issue, and so am I.

Climate change is real. One proposal alone isn't going to fix this massive problem. We need a serious and comprehensive policy on climate resiliency to prevent carbon emissions exceeding two degrees Celsius. Instead of demagoguing the issue, or those who have serious concerns about the real existential threat that exists, we need to come together to set a federal

policy that addresses the problem.

Mr. Halstead, do you agree that this is a real issue that requires leadership at all levels, from the halls of Congress, the C-suites, and every household that plays a role in reducing emissions?

*Mr. Halstead. Absolutely.

*Mr. Horsford. I would like to focus the remainder of my time on the cost of climate, and the implications on health care. Today U.S. health care spending has reached \$3.5 trillion. That is an average of \$10,739 per person, per year. That is how much we spend on health care in this country.

Health care spending accounts for 17.9 percent of our GDP. There is clear evidence that shows climate change will exacerbate health issues related to asthma, heart disease, diabetes, and cancer, as you pointed out, Doctor. I want to bring to your attention the Centers for Disease Control chart that was shared in your testimony.

[\[Slide\]](#)

There are some who claim solutions to addressing climate change will cost too much. Well, we cannot afford to address real impacts of climate change on our health. The truth is we are already paying for it, some with their very lives. And that is a cost none of us can afford.

So Doctor, your research concentrates on improving the cost effectiveness of our health care system. Can you please share with us how health care costs are growing due to climate change, and what specifically about the pharmaceutical industry can you

tell me on how it is considering the impacts of climate change in that industry, particularly?

*Mr. Jha. So Congressman, thank you for your question. And in many ways, you have articulated a point of I have tried to make all day better than I did.

Let me say that we have the most expensive health care system in the world. In many ways, a very high-quality health system, though it is not without its challenges.

What we know is that the diseases that are affected by climate change, whether it is emergency department visits for asthma, or hospitalizations for heart failure, strokes, heart attacks, these are incredibly expensive to treat. And the people who are affected are the children and the elderly, who are covered by public insurance. And so, if we are going to be good stewards of the public dollar, focusing on climate change is essential.

Now, unfortunately, because so little research has gone into the health effects of climate change -- I mentioned earlier, less than 0.05 percent of the NIH budget goes towards studying health -- the health effects of climate change. If health -- if climate change is the biggest public health challenge of our times, and I believe it is, the idea that you would spend less than 0.05 percent of a budget to study it is crazy.

*Mr. Horsford. Right.

*Mr. Jha. And what we -- and that has -- it hampered our ability -- hampered my ability to give you a more precise estimate, because we just don't know.

*Mr. Horsford. Well, what we do know is --

*Mr. Jha. And we need to learn.

*Mr. Horsford. It is a cost we cannot afford.

*Mr. Jha. We know it is expensive. We know it is harmful, we know it is expensive, and we need to quantify that expense, because we have to factor it in.

*Mr. Horsford. Thank you. Madam Chair, I would like to enter into the record this article entitled, "Climate Change Could be Big Business for Pharma," dated January 24, 2009.

*Ms. Sewell. So ordered.

[\[The information follows:\]](#)

*Mr. Horsford. Thank you. This is what some companies are saying.

AbbVie states, "Climate change may create a greater need for existing or even new products. Higher temperatures and drought conditions are becoming extreme. Our immunology product line could see an increase in sales as a result."

We have got statements from Eli Lilly, Merck, Pfizer. It is interesting to me that we have companies that are focused on how they can make a profit from what they can see are the impacts of climate change on health care, rather than working to address the issues that are contributing to climate change to begin with.

And so I would like to call upon the pharmaceutical industry, every CEO, every company, every advocate to work with this committee and other committees of jurisdiction, and let us come up with a common-sense, comprehensive plan so that we can worry about the people, and not the profits. And these articles can no longer be the example that we use in a committee hearing, but the real change that we want to see in our country.

Thank you, Madam Chair.

*Ms. Sewell. I would like to thank the witnesses for their testimony and their patience. I also want to thank the members for their participation.

Please be advised that members have two weeks to submit written questions to be answered later in writing. Those questions and your answers will be made part of the formal hearing record.

With that, the committee stands adjourned.

[Whereupon, at 2:22 p.m., the committee was adjourned]

Questions for the Record

[Questions from Rep. Gwen Moore](#)

[Response from Dr. Kate Marvel](#)

[Response from Dr. Ashish Jha](#)

[Response from Roy Wright](#)

[Response from Rich Powell](#)

Submissions for the Record

[Trust for America's Health](#)

[View Dynamic Glass](#)

[Public Citizen](#)

[The Medical Society Consortium](#)

[The Medical Society Consortium](#)

[Institute for Energy Research](#)

[Americans for Tax Reform](#)

[Fuel Cell and Hydrogen Energy Association](#)

[Alliance to Save Energy](#)

[CEO Climate Dialogue](#)