CLIMATE CHANGE, PART I: THE HISTORY OF A CONSENSUS AND THE CAUSES OF INACTION

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CLIMATE CHANGE, PART I: THE HISTORY OF A CONSENSUS AND THE CAUSES OF INACTION

Wednesday, April 9, 2019

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

The subcommittee met, pursuant to notice, at 2:27 p.m., in room 2154, Rayburn House Office Building, Hon. Harley Rouda (chairman of the subcommittee) presiding.

Present: Representatives Rouda, Hill, Tlaib, Gomez, Ocasio-Cortez, Comer, Gibbs, Higgins, Armstrong, and Jordan.

Mr. ROUDA. The subcommittee will come to order. Without objection, the chair is authorized to declare a recess of the committee at any time. This committee is convening the first in a series of hearings on climate change and the history of a consensus and the causes of inaction.

Now, I want to welcome our witnesses: The Honorable Tim Wirth of Colorado, Vice Chairman and President Emeritus of the United Nations Foundation; Dr. Michael Oppenheimer, the Albert Milbank Professor of Geosciences and International Affairs at the Woodrow Wilson School of Public and International Affairs at Princeton University, that's going to be pretty tough to get on your business card; Dr. Jeffrey Sachs, University Professor and Director of the Center for Sustainable Development at the School of International and Public Affairs, Columbia University; and Nicolas Loris, Deputy Director of the Thomas A. Rowe Institute for Economic Policy Studies and Herbert and Joyce Morgan Fellow in Energy and Environmental Policy at the Heritage Foundation.

I will begin by swearing you in. Please stand and raise your right hand. Do you swear or affirm that the testimony you are about to give is the truth, the whole truth, and nothing but the truth, so help you God?

Thank you. Let the record show that the witnesses answered in the affirmative. Without objection, I would like to have Senator Wirth, you are now recognized for five minutes to give your testimony. I'm sorry, Dr. Sachs, because I know you have a hard stop, so we're going to go with you first to provide your testimony. The floor is yours.

STATEMENT OF JEFFREY SACHS, PH.D., UNIVERSITY PROFESSOR AND DIRECTOR, CENTER FOR SUSTAINABLE DEVELOPMENT, SCHOOL OF INTERNATIONAL AND PUBLIC AFFAIRS, COLUMBIA UNIVERSITY

Mr. SACHS. Thank you very much, Mr. Chairman. I am honored to be able to participate in these important hearings. In October 1992, the U.S. Senate ratified the U.N. Framework Convention on Climate Change, with the objective to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. This is the law of the land under the Supremacy Clause of the Constitution. Yet for almost 27 years, the U.S. Congress has failed to adopt any major legislation to implement this treaty. Since 1992, greenhouse gasses have risen relentlessly, with CO2 concentrations raising from 357 parts per million in February 1992 to 411 parts per million in February 2019.

Climate safety is now nearly out of reach, thanks in no small part to the scandalous inaction of the U.S. Congress. In 2019, it is a bit late to discuss the views of Congressmen regarding climate science. Despite the pseudo debate over climate science in the Wall Street Journal and Fox News, there is no such debate among professional climatologists. This science goes back 150 years. It is absolutely a consensus, and the type of claims that are made about the debate are simply bizarre.

In 2019, it is a bit late to doubt the threats awaiting human kind if the U.S. Congress persists in its unconscionable inaction. The five hottest years on record have been during the past five years. The 20 hottest years on record have been in the past 22 years. Temperatures are already 1.1 degree Celsius above the pre-industrial level, and are higher than any decade of the past 10,000 years, the entire span of human civilization, the so-called Holocene.

The U.S. and the planet are buffeted by extraordinary heat waves, droughts, floods, forest fires, and extreme storms. The damage from climate-related disasters is soaring and has exceeded $450 billion during 2016 to 2018, or an average of $150 billion per year.

World leading climate scientist James Hansen, long NASA's lead climatologist, recently published the finding that earth is now as warm as it was during the prior interglacial period, known as the Eemian, when the sea level reached six to nine meters higher than today. Hansen concludes that we are at dire risk of a catastrophic rise in sea level by many meters.

In 2019, it is a bit late to doubt the practicalities of stabilizing greenhouse gas emissions. Engineering studies galore have repeatedly demonstrated that we already have the technologies needed to de-carbonize most or all of the world energy system, and that comprehensive de-carbonization is within reach and is economical. The key steps are to shift electricity from coal, oil, and gas to renewable zero carbon sources, mainly solar, wind, hydro, and geothermal, to electrify automobiles and home heating, and to meet other energy needs, for example, shipping, aviation, trucking and heavy industry through a combination of direct electrification in synthetic fuels manufactured with zero carbon electricity.

In view of these findings, the recent proposals for a Green New Deal make eminent sense, and a de-carbonization plan should be

put into legislation as soon as possible. Several recent studies have shown how the U.S. can de-carbonize the energy system by 2050. Several States, including California and New York, are already aiming to de-carbonize their power sectors before that date, yet the Federal Government is rudderless and without a plan, because of the chronic inaction of the U.S. Congress.

In 2019, it's late to claim that the U.S. should not act because other countries will not follow suit. The Paris Climate Agreement provides a mechanism to coordinate global actions. All 193 U.N. members States signed the agreement, yet only one, the United States, has declared its intention to withdraw from the agreement. With the science established, the climate disasters at hand, the future risks evident, the technological solutions available, and the diplomatic framework established, the question remains why Congress has so flagrantly failed?

In my view, it is money. The oil industry supports the campaign funding of much of the Congress, much of this committee, and much of all of the Congress, especially on the Republican side. For all of Congress, the oil and gas sector contributed $82 million in the last election cycle. The largest spending was outside money at $35 million; PAC money 15; Koch Industries spent by itself $10.5 million; eighty-seven percent went to Republicans; the co-contributions, 94 percent—99 percent to Republicans. Total campaign spending by the oil and gas sector since 1990 has totaled $622 million, with 81 percent going to Republican candidates.

In addition to the campaign spending, the oil and gas industry spends an astonishing amount on lobbying, $124.8 million during 2018, which comes to $232,000 per Member of Congress. The top five lobbying clients were ExxonMobil, Koch Industries, Chevron, Royal Dutch Shell, and the American Petroleum Institute. Their combined spending last year was $46.7 million. The total lobbying outlays of the oil and gas sector during 2010 to 2018 summed to a shocking $1.225 billion.

Twenty-two Senators wrote a letter to Trump asking him to pull out of the Paris Climate Agreement. Every one of those Senators, all Republicans, was funded by oil and gas PACs. The total oil and gas PAC spending for the 22 Senators for the period 2013 to 2018 came to $5,870,000.

The American people have lost confidence in the U.S. Congress. Only 11 percent of the public expresses a great deal or quite a lot of confidence in Congress down from 42 percent in the early 1970's. Only 8 percent describe the honesty and ethical standards of Congress as high, or very high, compared, for example, with 84 percent for nurses.

Our hopes rest with politicians who choose to run their election campaigns without accepting the corrupting money of corporate PACs, especially oil and gas PACs. All politicians should renounce oil and gas PACs and return to the business of protecting the American people.

Mr. Chairman, I implore this committee and the Congress to act without further delay. Twenty-seven years of inaction are dangerous enough. I know that I speak on behalf of millions of Americans and billions of people around the world who seek an urgent response to a world in peril. Thank you very much.

Mr. ROUDA. Thank you, Dr. Sachs. We are starting to bump up against a vote, but in the effort of trying to get a little bit more testimony in, Senator Wirth, I would like give you five minutes for the floor and to——

STATEMENT OF HON. TIM WIRTH, FORMER SENATOR FROM COLORADO, VICE CHAIRMAN AND PRESIDENT EMERITUS OF THE UNITED NATIONS FOUNDATION

Mr. WIRTH. Thank you very much, Mr. Chairman, and I'm delighted to be here and be back in the House where I spent 12 incredibly interesting, and, I hope, productive years. It is a great opportunity, and I am delighted to have you here. My message today is really very simple. We have understood the science of climate change for over 40 years. It hasn't changed, it has just gotten more refined and more granular and more clear in its specificity, but the basic thrust of that science has not changed. We know about the climate problem; we know about carbon; we know where it comes from; we know how it gets generated. And the basic question is, given this, we have allowed this climate crisis to increase dramatically. And the question is, why did we let this happen the way it has, and now what are we going to do about it? That's what you all are up to, and I am delighted that you're taking on this small and modest challenge. It is enormously important.

We went through a period in the 1980's and 1990's of significant bipartisan cooperation. Just as a marker of that, the biggest climate bill in the Senate was introduced in 1990, and it had 20 Senate sponsors, 12 Democrats and eight Republicans. That will give you a flavor of the bipartisan nature of this. George Bush—when George H.W. Bush spoke of the climate issue. He said, Now I'm going to apply the White House effect to the greenhouse effect, and they really went to work on a number of significant changes in public policy that had to be made. There are all kinds of examples of partnerships that occurred between Members of the Senate, Republicans and Democrats, and the same thing was going on here.

So what happened? How did this all come a cropper, which it did some time in the late 1990's, early 2000's? And I would attribute the change and move away from this time of cooperation to at least two factors: one, the ozone agreement. The discovery of the hole in the ozone came in around 1987, and by—in a very short period of time, the Congress had acted, the Ozone Treaty was signed, and changes were made. Very quickly, done very rapidly. But that was a sign to other people of what could be done, and what, for those who are opposed to it, of the kind of issue that had to be stopped.

A second marker was the clean air amendments of 1990. That, in a similar way, I think, caught the industries affected by surprise. Again, the Congress acted quickly. The leadership of the Congress acted rapidly. Dole and Mitchell were side by side in the amendments, and I think many in the industry thought this is getting out of control, you know, what we have got to do is make sure that the changes that are being requested and required, you know, are slowed down if not stopped.

Out of that grew the Global Climate Coalition, and the Global Climate Coalition was created by the National Association of Manufacturers, and in it was just about every industry in the United

States when it began in the early 1990's. It continued for 15 years until it ran out of gas, but during that 15-year period of time, it had an enormous impact: collecting political contributions, raising enormous amounts of research money, doing a lot of advertising that was really very—very false in terms of talking about the climate crisis.

They became a major force opposed to the changes that everybody in the scientific community believed had to be done and in which there had been a major bipartisan agreement. That stopped.

Now, why did it stop in 2020 right at the beginning of the 21st century? Well, the political pressure from these groups was intense, and I think a lot of people were really thrown off stride by that just as the industries, I think, were caught somewhat off guard by the rapid movement of the Montreal protocol and ozone, and by the rapid passage of the clean air amendments. I think many on the proponent side were caught by surprise by the very rapid development of the Global Climate Coalition.

Anyway, the two groups really remained in conflict, you know, for, I would say, a good 15 years. And it wasn't until the Paris Climate Accord that began the direction of those that these groups began to come together, aided by another very significant change, which was that most of the big industry groups dropped out of the Global Climate Coalition. They realized that there was a real climate crisis coming. They realized that there were great economic opportunities there, and they realized they had to get their industries more deeply involved in the public policy process. This occurred over—it didn't happen overnight, as you can imagine, but these industries, many of them became very involved and, I would argue, very helpful in turning the corner away from the world of confrontation back toward a greater time, a time of greater cooperation.

By the time of the Paris Climate Accord, you know, the world had really come together—this is a shorthand obviously—but it had come together in a very interesting and important set of new coalitions designed to make progress. No longer was it going to be governments dictating what the solutions were going to be, but it was a different kind of a process that was grassroots, bottoms up, and very important in that fashion.

So that's where we are coming out of 2015. We now have remnants of the battle. I think the current administration has not been helpful at all in encouraging the kind of changes that have to be made. In fact, they have been discouraging those and trying to turn back much of the progress made and to destroy many of the institutions that were built. But even so, the momentum is very significant and continues.

Which brings me to the final item I wanted to mention, and that's the Green New Deal. You know, I'm a great supporter of the fact that the Green New Deal was introduced. I think that it served a major policy goal by illustrating again and bringing to people's attention the need to move. It was not a prescriptive. Nobody ever thought the Green New Deal was going to be prescriptive. It wasn't a piece of legislation. It was a not particularly well-drafted prose document. But it raised the issue and the urgency of the intergenerational crisis. It raised the urgency of the fact that,

you know, we had to make changes that are going to impact possibly—probably, the poorest people in the country had to be thought about and focused on, and it made other Statements about what everybody knows has to be done, and the terms of the long group of changes.

So I believe that the people responsible for the Green New Deal deserve a pat on the back, not a kick in the shins, but rather, just say, Good job, and we hope everybody can pick up on the thrust of what they were trying to do. So, Mr. Chairman, thank you very much. Delighted to be with you.

Mr. ROUDA. Thank you, Senator Wirth. And as is the case, we have votes that we have to go to, and, Dr. Sachs, I realize you may not be here with us when we get back, and Dr. Oppenheimer and Mr. Loris, I apologize that we're going to put a delay on the continuation here. And I also would like to thank my colleague, Mr. Higgins, for coming in, so we can get this started. We are going to run to vote now, so we are adjourned now until—temporarily adjourned until, probably about—recessed, excuse me, until about 3:15.

Mr. HIGGINS. Mr. Chairman, before we adjourn, I would like—on the record, I would like to submit a question in writing to Dr. Sachs if he is not going to be here, and I thank him for appearing today.

Mr. ROUDA. Absolutely, that will be fine. And we will recess until approximately 3:15 p.m. or when votes finish, whatever occurs sooner. Thank you.

[Recess.]

Mr. ROUDA. The subcommittee will come back to order. Thank you, everybody, for enduring that delay. We're going to continue with witness testimony. Dr. Oppenheimer, I believe you are next up, so the floor is yours for the next five minutes or as much time as you need.

STATEMENT OF MICHAEL OPPENHEIMER, PH.D., ALBERT G. MILBANK PROFESSOR OF GEOSCIENCES AND INTERNATIONAL AFFAIRS, WOODROW WILSON SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, PRINCETON UNIVERSITY

Mr. OPPENHEIMER. Well, that's quite an invitation. Thank you, Mr. Chairman, and thank the committee for holding these hearings. I think they're especially important in light of some of the rather discouraging comments about climate science, or the facts that we heard in this morning's full committee hearing. I was asked by the staff to describe highlights in the development of climate change science that had occurred by late in the 1980's to illustrate how much scientists already knew at that time. Although the science of climate change and the greenhouse effect reaches back to the early 19th century, and you can read my full testimony if you want a summary and references.

Let me start by citing a 1979 report from the National Academy of Sciences, and I'll quote, "We estimate the most probable global warming for a doubling of carbon dioxide to be near three degrees Celsius," which is about five degrees Fahrenheit, "with the probable error of plus or minus 1–1/2 degrees Celsius." Now go on, "We have tried, but have been unable to find any overlooked or underestimated physical effects that could reduce the currently esti-

mated global warming due to a doubling of atmospheric carbon dioxide to negligible proportions, or to reverse them altogether."

In other words, a committee 30 years ago, 40 years ago, looked hard at this issue, came up with estimates for the amount of warming that would come from doubling the amount of CO2 in the atmosphere, which we're unfortunately well on our way to doing, and gave an answer which is not much different than today's and could not find, try as hard as they would, a way to negate those—that warming of the three degrees Celsius, which is quite substantial. The same remains true today. Things have not changed that much in respect to how large we think the warming could be.

After an avalanche of scientific developments during the subsequent 10 years, we already knew a number of other things, and I'll just summarize them. This is what we knew at the end of the 1980's: By trapping heat, greenhouse gasses had maintained a climate in which civilization developed and thrived. Much of the difference in the surface temperature between earth and its two nearest neighbor planets, Mars and Venus, Venus being hot, Mars being cold was due to the moderate greenhouse gas levels on earth. Atmospheric concentrations of the primary human made greenhouse gas carbon dioxide were increasing, we knew that at that time, mainly as a result of the combustion of coal, oil, and natural gas to produce energy, and that continues to be the case today.

Earth's global mean or average temperature had increased by about four-tenths of a degree Celsius, or seven-tenths of a degree Fahrenheit at that time since the late 19th century, and sea level had risen, as well. We knew all that then by the late 1980's. Today, earth is close to a degree Celsius warmer, and sea level is about 8 inches higher than it was about a century ago.

Fourth, we knew that the increase in carbon dioxide in the atmosphere would last a millennia, a very, very long time, unless a way were found to artificially remove it and store it somewhere. The same is true today. There's a long inertia in this problem. If ambitions were not reduced substantially, earth's climate would become warmer in the next century, and this is looking from the 1980's, so the next century is this century, than it was over the entire history of civilization, possibly warmer than it had been for several million years.

Now, we just either got very close to, or surpassed the first of those dubious milestones, that is warmer than in the history of civilization. We may be there already. And we are—unless we do something to curb emissions, we seem likely to be headed toward a warmer planet over the next century than has been witnessed in several million years. Way before humans evolved.

Resulting climate changes were expected to increase the frequency of very hot days and lead to impacts on water availability, crop yields, sea level, and natural ecosystems. We were worried then particularly about what was the canary in the coal mine of ecosystems, namely coral reefs, and coral reefs due, to a number of insults, including climate change, have begun to perish around the globe in the tropics where they live.

Today, most of these impacts have already been detected and much larger changes are forecast. In other words, the broad outlines of a problem bearing high risk for humans in society were al-

ready clear, even if many important details remain to be fleshed out. They were already clear 30 years ago.

To just bring us up to date, by the mid 1990's, the Intergovernmental Panel on Climate Change in which I have participated over the last 28 years, identified 19, 19 aspects of the global and regional climate, such as cloudiness, snow cover, glacier length, precipitation intensity, the thing that causes flooding rainstorms, to which scientists had detected trends associated with the warming.

So it is not just global average temperature is going up, it is not just sea level is rising; many, many features in the climate system, probably, if you could detect all of these changes, every notable feature of the climate system is already changing. Climate change has become pervasive and detectable across the climate system and the earth's system as a whole.

Since then, the scientific consensus has only solidified as new observations of the climate system have emerged, and improved modeling techniques have also been developed.

Uncertainty on some important questions remains a fact of life in the climate science world. For example, the future rate of disintegration of the large ice sheets in Greenland and Antarctica and the resulting effect on sea level rise remain largely uncertain, particularly in terms of what will happen later in this century.

By the way, the potentially unstable part of the Antarctic ice sheet, and the part of the Greenland ice sheet that is likely to slowly melt away, together contain an amount of ice which if it all were disgorged into the ocean, might eventually raise sea level by about 50 feet. That won't happen in this century entirely. Part of it will. Part of it will, even if we slow emissions, because there's a big inertia in the sea level rise system. Part of it will just continue to happen for centuries and centuries beyond, no matter what we do.

However, uncertainty in the face of high risk—uncertainty like this in the face of high risk, is no excuse for inaction to reduce the risk. We can see the outlines of the future, and it is not very comforting, especially with respect to the ice sheets.

I want to just finish with a word about the so-called climate skeptics. There's a great deal of difference between rational skeptics, those who are conversant with the scientific literature who can be convinced by evidence who subject their own ideas to rigorous review. There's a difference between those and the obdurate uninformed skeptics whose ideas about climate change never, or rarely are, found on the pages of a peer-reviewed scientific journal.

Regrettably, climate science has been under constant attack since around 1990 by the proponents of the latter approach and their facilitators. Presumably due to the increasing political stakes attached to this issue. There is evidence that these attacks have reduced the belief by the general public that a scientific consensus actually exists at all, a disturbing development that I hope these and other similar hearings help to counteract.

In conclusion, I would like to thank this committee and you, Mr. Chairman, for inviting me to testify, and I welcome the opportunity to answer questions, any questions you may have on this subject.

Mr. ROUDA. Thank you, Dr. Oppenheimer.

Mr. Loris, the floor is yours for the next five minutes. Thank you.

STATEMENT OF NICOLAS LORIS, DEPUTY DIRECTOR, THOMAS A. ROE INSTITUTE OF ECONOMIC POLICY STUDIES AND HERBERT AND JOYCE MORGAN FELLOW IN ENERGY AND ENVIRONMENTAL POLICY, THE HERITAGE FOUNDATION

Mr. LORIS. Thank you, Mr. Chairman, and Representative Higgins, for this opportunity to testify this afternoon. I want to express that the views in this testimony are my own and should not be construed as representing any official position of the Heritage Foundation. With my time, I would like to offer four brief points, the first three being what I perceive as the scientific, economic, and political reasons why we haven't addressed climate change at the Federal level, and the fourth being pro-growth policy solutions that are also pro-environment.

First, it is clear that climate change is real, and that human activity plays a substantial role. However, there are still many knowledge gaps and uncertainties that exist, including the varying estimates of how a doubling of carbon dioxide emissions in the atmosphere affects global temperatures, and which trajectory of greenhouse gas concentrations most accurately represent future climate scenarios.

Furthermore, estimating the economic costs of current and future climate change has its own set of problems. For instance, the integrated assessment models used to justify the social cost of carbon attempt to project costs out to the year 2300, which is problematic in and of itself. More fundamentally, reasonable changes to the inputs of these models produce widely different numerical results making them unreliable in determining what the actual social costs of carbon might be. Other cost estimates use unrealistic forecasting or do not properly account for humans adapting to climate change over time. All of these variables impact how costly or not costly climate change will be.

Second, the economic justification for Federal inaction on climate change is quite clear. The proposed policies at the Federal level would be costly and ineffective. Policies that restrict the use of conventional energy resources will increase energy prices, which is just a small part of the overall costs. Americans would pay more for food, healthcare, education, clothes, and every other good and service that requires energy to make and transport.

Importantly, these policies are highly regressive as they disproportionately impact low income families who spend a higher percentage of their budget on energy costs. With regard to the climate benefits from Federal policy, they are practically undetectable. Even if the U.S. achieved net zero emissions goal, the averted warming would be less than two-tenths of a degree Celsius by the turn of the century. To have any impact on climate, the entire world would have to quickly change how it consumes energy or simply remain undeveloped. Both of these are devoid of reality. While many countries are rapidly expanding their use of renewable power, forecasts indicate that coal, oil, and natural gas will represent the overwhelming majority of the world's energy needs well into the future. For developing countries, reducing energy poverty and improving standards of living are the higher priority.

Third, when it comes to the political obstacles, consumers' unwillingness to pay prevents a hurdle for lawmakers. A recent poll

found that 68 percent of Americans oppose paying an additional $10 per month to fight climate change. A separate poll found that 43 percent wouldn't even be willing to pay an additional dollar a month. Nor is action on climate change a public policy priority for voters when compared to other issue areas.

Now, to be clear, my skepticism of unpopular costly and ineffective policies is not an excuse for complacency or a do-nothing strategy. I believe Congress should advance pragmatic policies that will drive energy and environmental innovation. For instance, our national laboratories are important conduits to spur technological advancements. We have benefited from Department of Defense R&D and alternative energy sources that have not only enhanced our military's mission capabilities, but have also produced significant economic breakthroughs.

Another objective for Congress should be to eliminate subsidies for all forms of energy to eradicate the pervasive cronyism and corporate welfare in energy markets. Subsidies concentrate benefits to a select group of politically connected interests and disburse the cost amongst the rest of us. Moreover, this preferential treatment traps valuable resources in unproductive places.

Instead, we should make emissions-free energy sources like nuclear and renewable power more economically desirable by fixing the excessive regulatory burdens that plague these industries.

Furthermore, competition in electricity markets provides greater choice, so that if businesses and households want to go 100 percent renewable, producers can meet that demand. Expanding technological innovation through free trade is yet another avenue to meet the world's energy needs while reducing emissions. Tariffs and protectionist policies are unproductive.

Last, we shouldn't dismiss the fact that access to affordable reliable energy and continued adaptation to extreme weather is critical to reducing risks for families and businesses. A recent working paper in the National Bureau of Economic Research concluded that the drop in natural gas prices induced by the shale revolution averted 11,000 winter deaths per year.

In addition, more resilient durable infrastructure will protect people from climate-related vulnerabilities. Using the best scientific and technical information available will improve resilience and readiness for current and future climate-related challenges, no matter what the cause. Mr. Chairman, thank you again, and I look forward to your questions.

Mr. ROUDA. Thank you, Mr. Loris. At this time, I would like to recognize myself for five minutes for an opening Statement. This hearing is a first in a series of hearings on climate change that the Oversight Subcommittee on Environment plans to hold during the 116th Congress. It is my goal that we can work in a bipartisan manner to examine the history of climate change, the effects of climate change that are currently being felt across this great Nation, and solutions to the current climate crisis, solutions that not only will address this critical issue but create new industries and jobs for those countries who take a leading role.

It is our job as representatives of the American people to prevent the effects of climate change from getting worse. That's why I'm holding this hearing, not to point fingers at any of my colleagues,

not to chastise industry players and executives just for the sake of it. We are here to solve a problem of enormous magnitude, and the best solutions to big problems have always been forged by all of us coming together to devise sensible, feasible solutions that account for the diversity of American interests.

Today, we will affirm that the science on climate change has been known for decades, as we have seen from the testimony already. In 1977, Exxon Oil Company's own in-house senior scientist told the company's senior management that, quote, "There is general scientific agreement that the most likely manner in which mankind is influencing the global climate is through carbon dioxide release from the burning of fossil fuels."

This same scientist went on to say in 1978 that we had a, quote, "time window of five to 10 years before the need for hard decisions regarding changes in energy strategies might become critical." Again, that was 1978. Exxon acted on this information, immediately launching further research into the effects of carbon dioxide on the planet, research that included extensive climate modeling.

Royal Dutch Shell, in an internal document titled, ″The Greenhouse Effect,″ outlined Shell's extensive knowledge of climate change implications and warned by the time global warming became detectable it would be too late to take decisive action. That was also in 1988. These aren't liberal environmentalists making these dire predictions. They are oil company's own management recognizing the scientific reality and the need for serious action. These energy companies knew then what we all know now, science matters.

The U.S. Government also knew. In 1988, Dr. James Hansen, a NASA scientist, testified before the Senate Committee on Energy and Natural Resources on a panel convened by one of our witnesses here today, Senator Tim Wirth, another one of our witnesses, Dr. Michael Oppenheimer, testified that Dr. Hansen—with Dr. Hansen on that panel, and together they warned the Senate and the American people of the dangers of a warming planet.

America listened. President Ronald Reagan created the Intergovernmental Panel on Climate Change. President George H.W. Bush helped convene the Earth Summit in Rio de Janeiro in 1992, and signed the United Nations Framework Convention on Climate Change, an intergovernmental treaty recognizing the problem of climate change and calling on all nations to take efforts to address it. This treaty was ratified by a unanimous vote in the Senate.

It seems incredible, I know, but in 1992, the U.S. Government agreed with 154 nations that, quote, "Human activities have been substantially increasing the atmospheric concentration of greenhouse gasses, that these increases enhance the natural greenhouse effect, and that this will result in an average in additional warming of the earth's surface and atmosphere and may adversely affect natural ecosystems and humankind."

In 1997, the nations of the world met in Kyoto and decided that the problem was serious enough that each nation needed to go further by making binding commitments to reduce emissions.

In 2015, the parties met in Paris, and due, in large part, to President Obama and Secretary of State John Kerry's in depth negotiations with China, the parties came to a collective agreement

that all nations in the world would work to keep the average global temperature rise below two degrees Celsius by the year 2100, and ideally below 1.5 degrees Celsius. That is the Paris Climate Accord.

The U.S. was part of this global consensus until June 1, 2017, when President Trump, contrary to overwhelming fact-based evidence from the scientific community, and the direction set by Presidents Reagan and George H.W. Bush, announced his unilateral intention to withdraw the United States from the Paris Climate Accord. This announcement was made almost 29 years to the day after Dr. Hansen testified that global warming was a threat to this planet and to humanity.

Now here we are in 2019, and the Federal Government has taken very little action in response to climate change. The science hasn't changed, the scientific evidence has been there all along, but the politics did. Political disagreements are a hallmark of democracy, and I welcome constructive debates about what to do about the problem of climate change. But politics should be separate from the acknowledgment of the problem itself. The science was clear then. It is equally clear now. And our panel today is going to help us make sure and sense of why the U.S. has not taken decisive action to address what we have known for decades.

Again, I want to thank the individuals who have come to testify. I will close with, I believe, that the U.S. can rise to meet this challenge, and to quote John F. Kennedy, "We will do so not because it is easy, but because it is hard." As Americans, this is our time to lead the world as we have done many times throughout our history, for us, for our children, and four all future generations.

At this time I would like to turn it over to my colleague, the acting ranking member, Mr. Higgins from Louisiana. Thank you.

Mr. HIGGINS. Thank you, Mr. Chairman, and thank you to our witnesses for their participation in today's hearing. There's a couple of things that I have noted from listening very carefully, very prayerfully, to the testimony thus far. Everything here, everything around us is touched in two ways by regulations of the Federal Government, and by the oil and gas and petrochemical industry, the clothes upon our back, the glasses that we wear, the seats upon which we lean, the carpet under our feet.

Let's have no illusion about the point of today's hearing. The majority has called this meeting for the sole purpose of condemning the oil and gas and petrochemical industry. I call for a bipartisan and candid discussion about the challenges of climate change that we face as a species that are blessed to inhabit this earth. It is our responsibility to address these challenges within the parameters of our constitution, and based upon a sober interpretation of the science as it is available to us.

I'm old enough to recall when the science of the time Stated that very soon, global cooling would overtake the planet. Then the language changed to climate change. And now in today's hearings, we have heard more about global warming again.

So it is not the doubting of science, it is the reasonable question of the interpretation of the scientific data. This is what we seek, and we must recall that we are a union of 50 sovereign States, a representative republic, with constitutional parameters, and that there's no such thing as Federal money. It is the people's treasure.

We will, no doubt, hear of accusations and anecdotal stories to justify inquiries into American businesses. This day we'll hear this. By global standards, these industries are leaders for operations conducted in the cleanest and safest manner. American industry leads the planet in clean, efficient, and safe operation. You will, perhaps, not hear from my colleagues across the aisle the countless achievements for our Nation's energy industry has made toward cleaner and more efficient operations. In fact, since the year 2000, the oil and gas industry has invested over $108 billion into greenhouse gas mitigation technology.

The slide behind me based upon reporting in 2015 and 1916 alone, the oil and gas industry directly reduced emissions by the equivalent of 57.1 million metric tons of CO2. American industry did this, not Chinese industry, Indian industry, Brazilian industry, American industry. For comparison purposes, this reduction of CO2 is equal to the same amount of carbon sequestered by 67.2 million acres of forestry.

Further, the investment in the nine hydrocarbon resources made by the oil and gas industry, such as wind, solar, and geothermal resources that my colleagues have made their priority, account for over 16 percent of all our Nation's investment into new and emerging sources. I support these private investments by industry and by other organizations. An all-of-the-above energy strategy should be our path. It is my goal forward for America, and I look forward to the progress that will be made, especially into small modular nuclear reactor technology, solar, and other sources of clean renewable energy, but this will come from American industrial investment, not from bureaucrats in D.C. Every one of us wants to leave a cleaner environment for our children and grandchildren. However, the demonization of the fossil fuel industry and radical calls for its abolishment are increasing from my colleagues across the aisle as posturing takes place for the 2020 elections.

Even if we were to completely curb our Nation's CO2 emissions, which at this point would destroy our national economy and injure countless Americans, it would not make a dent on global emissions. Countless other nations, including China and India, would immediately negate any progress that we made. The American industrial model should be the model for the world, and within the parameters of our constitutional restraint, to recognize the rights of States and individual citizens therein were limited in scope, what shall we do? We will address these problems with reason and soundness of judgment. We should not call for radical proposals that end fossil fuel. We should be working internationally to bring American industry, ingenuity and standards to other countries.

Mr. Chairman, I thank you for your indulgence. I look forward to today's hearing and the testimony of our witnesses.

Mr. ROUDA. Thank you, Mr. Higgins. At this time, I would like to recognize myself for five minutes for questions. I would also like to point out that I, too, Mr. Higgins, am thankful for the attempts and direction that the energy companies are leading in embracing clean energies and renewable energies, but as they pointed out from their own studies from the 1970's and 1980's, we need to do more, and we need to do more sooner, and that is really the goal of these hearings is to move in that direction, not to have discus-

sions about eliminating industries, but looking at how these industries can help transform our economy and the world's economy to clean energies and renewable energies.

This used to be a bipartisan message. In the 1970's and 1980's, we saw bipartisan support for just this purpose. In fact, I used to be a Republican. I remember when environmental stewardship was something that was front and center for Republicans, and I'm hopeful that this committee, and the full committee, as well as our entire Congress, can get back to recognizing that it is not a debate about whether climate change exists in humankind's influence, but what we can do together to address it.

So with that I would like to begin my questions here today by asking the panel, and I want to make sure I heard correctly. None of you believe that climate change does not exist. Is that correct? And all would agree that humankind plays a primary or leading factor in that regard. Is that correct? Let the record show that all three witnesses agreed with that information, both Democratic and Republican witnesses.

That brings us to our next question, the urgency of acting now. Senator Wirth, what role do you think the government must play in order for the United States to meaningfully respond to climate change?

Mr. WIRTH. Well, thank you, Mr. Chairman. I think there are a string of activities the government should be supporting. First of all, I think we have to remember that one of the things that you have talked a lot about how things have changed over the last 40 years, and one of the most important things that has changed is the fact that so much of American industry, and Mr. Higgins mentioned this, so much of American history has become engaged, you know, been very supportive of climate reduction efforts, and been very much out front, in fact, often beyond what anybody in the government might have been doing at the time.

So what are they asking? They're often asking for, make sure that the rules and regulations that govern our whole energy package, and a lot of those are Federal rules, are ones that can facilitate, and I think a review at all times of the regulatory apparatus is a very, very constructive step to take, and investments in the future that R&D strategy, much more effective than the one we have now, I would certainly recommend that we undertake.

I think there are a variety of items in the so-called Green New Deal that must be pursued and understood. If not very specific items that are there, certainly the thrust that we have to be deeply concerned about the communities and the country and around the world that are most affected by climate change, you know, how are they affected and what kind of equities are built into whatever what climate solutions we make? What kind of intergenerational compact are we leaving for the next generation or the next two generations that come along? And how do we make sure that those interests are understood, which means that we have to act much more aggressively and much more rapidly.

So in my testimony, I lay out a number of specific items that Senator Hart and I, for example, developed in response to the Green New Deal and all the criticism it received by way of saying that we thought that the Green New Deal had done an enormous

amount of good by focusing attention, bringing people to think more broadly about what has to be done.

Mr. ROUDA. Thank you. Mr. Loris, some of the testimony from Dr. Sachs, and he is not here to talk about it, but talked about the money in politics. And H.R. 1, which was passed by the House a few weeks ago, helped and hopes to address money in politics. I believe some of your testimony talked about that, as well. Can you elaborate on, if we had greater transparency, in getting the money out of politics, especially in this industry, how that might be able to positively impact addressing climate change?

Second, and arguably more important, the economic incentives could be shifted to drive renewable clean energies and allowing energy companies to be a leader in doing so?

Mr. LORIS. Yes. Well, I think the best avenue to getting money out of politics is to reduce government intervention into the marketplace broadly, and that comes with getting rid of all of these subsidies that accrue to the oil and gas industry, to the coal industry, to renewables and to nuclear, because if you get the government out of picking winners and losers, there's less of an incentive to lobby. There's more of an incentive to rely on the market price and price signals to drive innovation in the energy sector.

So I think that the root cause of some of this is just the historical policies that we have had in the past, whether it is subsidies for oil and gas or something like the renewable fuels mandate, these are all policies that incentivize more lobbying and trying to keep the entrenched special interests the status quo, rather than trying to reform energy policies more broadly.

I think the renewal fuel standards is a very good example because a lot of environmental activists are now against first generation biofuels. There's a whole host of world hunger organizations that are against first generation biofuels, yet this policy is in place because it benefits those entrenched special interests. So when we get the government out of the energy sector in picking winners and losers, it reduces that root cause of lobbying.

Mr. ROUDA. Thank you. And at this time, I will yield five minutes to you, Mr. Higgins, for questions.

Mr. HIGGINS. Thank you, Mr. Chairman. Mr. Loris, there's been talk in the media for quite some time about natural disasters. I believe that is a false narrative, it is not supported by recorded occurrences. Being from Southern Louisiana, I'm going to focus on hurricanes. Over the past 60 years, the United States has seen a steady decline in hurricane landfalls. This is contrary to what most Americans that pay attention to mainstream media, or perhaps the scientific interpretation of the day would say shifted since I have been alive from global cooling to climate change or global warming. That most Americans would say, surely landfalls have increased, but the data proves otherwise. The data clearly shows the natural disaster rates have decreased over the years.

Despite these positive projections, today's natural disasters are more costly than ever before because of Federal, State, and local governments have failed to invest in infrastructure.

I'm from Louisiana, born and raised in South Louisiana I'm no stranger to natural disasters. After Hurricane Harvey, I went into Texas with civilians on rescue operations, and the last rescue oper-

ation I personally participated in, I'll never forget, we rescued an elderly gentleman from his home. When we were getting him out of there and he was safe physically. He found out I was a Congressman, I certainly didn't look like one. I never forget what he told me. We should all remember this. He said, he said, "Congressman Higgins, I have been living in my home since 1968. I have seen this much water fall, but I have never seen this much water rise."

This struck home to me in my heart, and since I have been in Congress, we have made a focus of our office to restore funding for proper dredging, for our water management systems, man-made or natural, to restore their intended parameters, the water is trying get back into the Gulf. We, as a government entity, at the local, State, and Federal level, have failed the American citizenry regarding the impact of disasters, which the data clearly shows the frequency of which have decreased, but the costliness has increased, not because God is dropping more water on us but because we have failed as government to maintain our water management systems.

In Louisiana, private industry, specifically the oil and gas industry, is a private investor in coastal restoration projects to limit the effects of hurricanes while Congress continues to spend billions, hundreds of billions of dollars responding reactively to disasters, the oil and gas industry has invested proactively.

Mr. Loris, looking at some of the past hurricanes that have impacted the Gulf Coast such as Katrina and Harvey, is it that these storms are more powerful than ever before, or that is it that we haven't significantly invested in mitigation infrastructure? What investments in our infrastructure help curb the effects of natural disasters if you would take a portion of this minute and 30 left, and I would like the other gentlemen to respond. Would investment in infrastructure help our Nation?

Mr. LORIS. It would. It would help our civilian infrastructure, and it would help our military infrastructure. I know a lot of the previous hearing focused on climate change's impact in the military, and we have seen that no matter what the cause is, military installations have been impacted by flooding, coastal erosion, and other sorts of natural disasters and extreme weather events.

What happened in Nebraska most recently is a good case study of the Federal Government lagging on the ability to approve infrastructure that would have helped reduce——

Mr. HIGGINS. So you concur that investment in infrastructure is a realistic response to the impact of natural events, water events, natural disasters? Doctor, do you have a comment on that, sir?

Mr. OPPENHEIMER. Yes. I have a comment on a few things that you have laid out. First of all, U.S. landfall hurricanes, you're quite correct, there is no known long-term trend, however, in the North Atlantic Basin, which includes the Gulf and the East Coast of the United States, there has been, virtually, certainly, a trend in an increase in intense hurricanes. Now, we don't understand why hurricanes sometimes hit the Coast and sometimes go harmlessly out to sea.

Mr. HIGGINS. That's a valid point, but I'm on limited time. Would you share that data with us and the committee?

Mr. OPPENHEIMER. Certainly. I would also—one more point along those lines, Hurricane Harvey has been subject to intense analysis,

which has shown that one of the reasons the flooding was so intense was because the precipitation intensity was enhanced by a warmer ocean feeding more moisture into the system.

Your third point about infrastructure—I think you're absolutely right, that we need to be ready for nastier and nastier climate-extreme events, and we're going to, in many cases, need an enhanced investment in infrastructure.

Mr. HIGGINS. Thank you for your clarification. And, Mr. Chairman, I would like to thank you for the tone that you have set for this hearing, sir. It is quite bipartisan, and I think helpful for us all.

Mr. ROUDA. Thank you. I would like to recognize the gentlewoman from California, Katie Hill, for five minutes and also ask that she chair for me while I step out for a moment. Thank you.

Ms. HILL.[Presiding.] Thank you. And thank you all for being here today. Senator Wirth, you spent much of your life in public service serving your country, and I want to thank you for that, including as a Member of this body. You were on the landmark panel in 1988, which included Dr. Hansen and Dr. Oppenheimer, where the alarms were first sounded on climate change. Do you happen to remember if there was much talk about the next generation on that panel, and about protecting our kids and doing something for our kids?

Mr. WIRTH. Well, there were two scientists on the panel, Oppenheimer and Hansen, and I was just a convener, I was the political hack putting it all together. But the discussion afterwards was truly intense. I think people were very surprised to hear somebody say this is not something that's theoretical, but it reached over from the theoretical into the practical. This is something that we observed, and the impact that then began to engage for people was significant, and was there focus on young people? Yes, because we began to understand this wasn't going to be an intergenerational battle, and we're not going to be able to solve it in one generation, but we're leaving for the next generation an enormous legacy of damage that's been done to the environment and the living community.

So it is our obligation to really move on it much more aggressively than we might have otherwise.

Ms. HILL. The reason I ask is because I was born in 1987, so when you had that panel in June 1988 I was in diapers, and I was nine months old. I hadn't walked yet, and so——

Mr. OPPENHEIMER. We would have welcomed you.

Ms. HILL. So now I'm the generation that's here, and I have kids literally coming into my office almost every day who are seven, eight years old. Their parents are telling me that they have nightmares, they can't sleep because they're worried about climate change, and they're worried about whether there is going to be planet. And so, you know, I feel obligated to be the voice of the next generation who is standing here saying nothing was done or not enough was done, and I know that's not on you, per se, but I do think that this is a mandate that we have to act now.

I'm also—I come from a district that's very split between Democrats and Republicans, and one thing that I have learned recently is that Democrats and Republicans didn't seem to be so far apart

as they were previously. Can you tell us if Democrats and Republicans on the committee shared a belief in the science on climate change?

Mr. WIRTH. Oh, at that point, as I pointed out earlier, we introduced a major climate bill the first big one right after the Hansen hearing, and 16 titles that ranged all across everything we have talked about today and more. And at the time of introduction there were, 20 Members of the Senate who sponsored the bill and its introduction, and those were 12 Democrats and eight Republicans. I mean, we were following in the footsteps of Dole and Mitchell, who had a very tight partnership in thinking about what had to be done in the world of clean air, and the Clean Air Act amendments were just coming up. There were any number of partnerships between members of both parties. So there was a real feeling of cooperative endeavor.

Now, how that got broken up is something worthwhile you all thinking about, and coming to understand, because I think that's a very important lesson in that, and from that, we might get a better sense of how we bring people back together again. You understand our history is always a helpful thing to do, I think.

Ms. HILL. Absolutely. Thank you. And, Dr. Oppenheimer, would you agree?

Mr. OPPENHEIMER. On bipartisanship?

Ms. HILL. Yes, with his impression.

Mr. OPPENHEIMER. Of course. Many of the political leaders I dealt with over the years were Republicans and were exerting strong leadership on this issue going back to Senator—Rhode Island Senator Chafee, and we would love to see those days return.

Ms. HILL. So, Senator, you attended the Earth Summit in Rio in 1992, where over 100 State—heads of State assembled to address global warming for the first time in history, and the U.N. Framework Convention on Climate Change, the treaty that came out of that summit, the parties, including the United States, bound themselves to, quote, "Stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic human-induced interference with the climate system. That treaty was supported by both"—"by President George H.W. Bush, and ratified unanimously by the Senate in 1992."

Senator Wirth, how did we get from that place to, you know, with unanimous ratification to the Senate's rejection of the Kyoto Protocol just five years later, it seems like a very quick turnaround.

Mr. WIRTH. Well, I think at that point, things were moving very rapidly both among the advocates and the opponents of doing anything in terms of climate change. I think that the people who were very concerned about the Clean Air Act amendments, about the Kyoto—about the ozone treaty that came out of Montreal, there were a number of major national and international actions at that point that I think caught many in the industry by surprise. It happened so quickly, and out of that, I think they decided to mobilize and out of that came their very effective from my perspective, unfortunately, the effect of the Global Climate Coalition, and that lasted for about 20 years, engaging almost every major industry in the country until they dropped off slowly but surely, and the Global Climate Coalition faded out in the early part of the 21st century.

Ms. HILL. I know I'm out of time, but I just want to sum up quickly and tell me if I'm right or wrong, but it sounds like the fossil fuel industry got scared of rapid changes happening, and kind of mobilized and left the next generation, my generation, in the dust, and left us with a lack of action entirely.

Mr. WIRTH. And the advocates on the other side were caught by surprise themselves at the vitriolic and incredibly well-organized and highly funded efforts on the other side. So suddenly, both sides who had been spending an enormous amount of time and energy together for the last 25 years were split asunder by, you know, a rapidly changing political environment.

Ms. HILL. Well, I would argue that we now have to make sure that the time is now to not be caught by surprise. We have had 30 years to try and figure out action moving forward, and I thank you for your testimony, and we will carry the torch. I yield to my colleague over there.

Mr. ARMSTRONG. Thank you, Madam Chair. So when we're talking about how we move forward, when we talk about clean energy, and I talked about this a little briefly this morning and—but the conversation that we have to continue to have is as we move to these new forms and continue to use them more such as wind and solar, we have to recognize that in order for those to work—more efficiency in buildings, those things all are great, but the highest driver of carbon pollution in the United States right now is transportation, and so as we move to wind and solar and electric powered vehicles, we are moving toward batteries. Batteries are a part of this conversation, and the metals we use in batteries are—I'm just going to use two examples, because China essentially controls about 90 percent of the world market in rare earth metals, and then cobalt is actually incredibly important for electric vehicles, and that's mined in the Democratic Republic of the Congo.

So as we move forward with this, and we have done a lot over the last decade to become energy independent in this country, but are we having conversations about that infrastructure and what we're doing, because I'm not aware of a lot of rare earth mines being permitted in the United States, and I know for a fact that China doesn't always have our best economic interests at heart.

So as we continue to transition into these things, don't we have—I mean, because we're off-shoring pollution doesn't necessarily mean—I mean, we're dealing with carbon emissions, but at what expense, and that's my question. And I'll start with Mr. Loris, and then but really, ask everyone, because most of these places would be qualified as Superfund sites in the United States. I mean, they're incredibly toxic to ground rot, they're incredibly toxic to the environment. So in our quest for cleaner energy it doesn't do us a lot of good if we're exporting pollution, whether that means we're exporting oil, natural gas, coal to countries that don't have our regulations are creating a market in countries that have an economic incentive to mine these products as fast as possible, and not in the cleanest way possible. And then from a national security and economic security standpoint, do we have to be concerned that one country will control 90 percent of essential materials we need to create these batteries?

Mr. LORIS. Well, I think from an environmental efficiency standpoint your point is well taken. If you look across the board as to what the United States does with regards to mining and operations or cement manufacturing our energy intensity is far better than developing countries and our emissions per unit of output is far lower than developing countries. And so, if we enact expensive regulations that are going to drive these companies overseas, you are essentially exporting those CO2 emissions and making no noticeable impact in climate, you're actually making things worse, so that's problematic.

Second, I think the environmental review and the permitting processes for all energy infrastructure projects are in need of reform, whether it is for rare earth mining, whether it is renewable projects and transmission lines and citing, the more we have competitive regulatory reform that allows these technologies to come online, that allows these mines to be developed, the better off we'll be in terms of an economic efficiency standpoint, but also just from an energy access standpoint.

Mr. OPPENHEIMER. I think both concerns are valid. If we are fortunate and make an energy transition quickly, that will probably involve electrification of transportation. That implies if it is going to work and reduce carbon dioxide emissions at the same time, a grid with higher levels of storage and a smart advanced grid that can wield the intermittent renewable power, merge it with remnant amounts of fossil fuel power over time.

Mr. ARMSTRONG. I want to just briefly—storage requires batteries.

Mr. OPPENHEIMER. That is correct. Storage—these issues about rare earth metals, et cetera, are issues of batteries, too, but it is not a solution to the problem to let an industry develop here, which would maybe satisfy security concerns and let it be as dirty as the same industry is in China. It is a healthy, strong, reasonable regulatory system that we need to make sure we don't wind up with a cesspool here the way it is in some other countries.

Mr. ARMSTRONG. Well, and I don't disagree with that, I mean, we talk about permitting for solar and wind and the problems we run into in that whether it is at the State or the Federal level—I mean, I can't imagine—I mean, in all reality, the permitting for rare earth mine, I mean we are not going—I mean, we—developing these quickly is not—I hope we do develop them, but I'm a little skeptical that we can develop them quickly. I'm more concerned about reliance on a lot of these countries to provide our energy after working hard to become energy independent, but with that I know I'm past my time, so thank you, Mr. Chair.

Mr. ROUDA. Thank you. And now I recognize the gentlelady from Michigan, Congresswoman Tlaib.

Ms. TLAIB. Thank you, Chairman. In my district, we have been fighting for years to hold corporate fossil fuel polluters, like Marathon Petroleum, the coal carbon industry accountable. When black piles—I don't know if you heard this story, but black piles of what they call petroleum coke started showing up on a Detroit riverfront blowing into people's homes, and many of us organized around that, even though the State and everyone said it wasn't toxic we had it independently tested and it had carcinogenic, and all these

other toxins in there that cause cancer and respiratory issues, and we fought extremely hard to get it removed, but it was because of land use, not because of environmental protections.

It was, you know, for many of us that live in these communities for us, you know, it is not 12 years. Our 12 years is here now, and that's how I feel when we talk about climate change. If folks want to see really what it looks like not to do anything, you should come to my district, where I think the smell sometimes—growing up I thought that smell was normal, and one in five children have asthma. I have some of the highest rates of cancer and respiratory issues in some of my ZIP Codes within the 13th congressional District.

So I'm really concerned about the fossil fuel industry and others, which are continued to poison our national conversation and stop meaningful Federal action on climate change.

So I would like to go right to the panel and to ask each of you, are you aware of any organizations that are currently working to spread misinformation, or sow unreasonable doubt about the science of climate change?

Mr. WIRTH. Well, I think the organizations that are in opposition have become much more subtle and sophisticated than they were before. You know, they're not coming out and confronting the issue of climate change.

Ms. TLAIB. You mean they're hiding?

Mr. WIRTH. Well, hiding, to use your language. They are hiding, but they're much more sophisticated about it. And, you know, they're funding university laboratories for example, which is a way of insinuating themselves and legitimizing a lot of the work that they do, some of which is very valuable, by the way, but not to be perfectly straightforward and honest about what's going on.

I'll give you an example. In my backyard, the oil shale and industry has just boomed, you know, and the amount of fracking looks like measles on some of the counties in Colorado. And one of the key issues going to what you were talking about in terms of health is methane emissions, and what we're now learning about methane emissions and children's health and endocrine disrupters and what happens, you know, it is a very, very subtle kind of science, and that's enormously important and has to be also part of what we think about. That's what you're seeing in Detroit. That's what we're seeing in north of Denver and that whole—in the whole shale area. You have to figure out how we're going to set the other rules related to methane just like you're looking for how do you set rules related to coal emissions.

Ms. TLAIB. So, and I don't want to—there's organizations like Heartland Institute, the Cooler Heads Coalition, the Competitive Enterprise Institute, and ALEC, the American Legislative Exchange Council, are still promoting these climate misinformation campaigns as you know. So, for example, in 2011, ALEC made a submission to the EPA docket, which I would like, Mr. Chairman, without any objection I would like to submit for the record of the committee, where they said, quote, "Carbon dioxide is a natural occurring, nontoxic, and beneficial gas, and it poses no direct threat to the public health." Statements like these are false and mis-

leading. It makes me so angry because I have so many children that are directly impacted by doing nothing.

Do not take—you know, many of them do not just take, you know—I wouldn't just take my word for it. Take the word of Eric Schmidt, the chairman of Google who vowed to disassociate his company from ALEC because, quote, "The facts of climate change are not in question anymore." And Mr. Schmidt went on to say, "and so we should not be aligned with such people that are just literally lying."

And so, Mr. Loris, is it true that your organization, the Heritage Foundation, has received funding from petroleum industry sources like the Koch brothers?

Mr. LORIS. We have in the past. I don't know when the last time they gave us money. But can I clarify one thing? Never has any donation or contribution to my organization ever influenced what I write or how I view energy economics.

Ms. TLAIB. Okay. And you're a former employee of the Koch Charitable Foundation, correct?

Mr. LORIS. That's correct.

Ms. TLAIB. According to a reporting, the Koch brothers have donated more than $100,000,000 since 1997 to dozens of groups that spread climate misinformation. According to reporting in the New Yorker, the Koch brothers have, quote, "funded many sources of environmental skepticism, such as Heritage Foundation, which has argued that scientific facts gathered in the past 10 years do not support the notion of catastrophic human-made warming." Is that correct?

Mr. LORIS. The catastrophic part is what's correct. In my opening Statement as well as my written testimony I acknowledge that man-made emissions are contributing to warming. You know, from 1951 to 2010 you have seen over 50 percent of the warming likely attributed to man-made emissions. What I think is irresponsible is those climate catastrophe scenarios that are borderline impossible. If you look at what the IBCC looks at the national climate assessment with regard to different representative concentration pathways of greenhouse emissions, where you get the really scary climate scenarios, is if you have every ounce of coal extracted from the world, if you have low technological development, if you have low economic growth, and you have a tripling of our population essentially, and I don't think those scenarios are all that realistic. And so, yes, I think some of that climate catastrophe scenarios are not grounded in reality. That's not to say that climate change isn't occurring and that there aren't costs, but those high end scenarios are very unlikely.

Mr. ROUDA. At this time, I would like to recognize the gentlewoman from New York, Congresswoman Ocasio-Cortez.

Ms. OCASIO-CORTEZ. Thank you, Mr. Chairman. One of my larger concerns is that climate change is not just an environmental issue. It is also a crisis created by massive corporate corruption and misconduct. In fact, ExxonMobil is currently the subject of a massive New York lawsuit alleging that the company defrauded and deceived its own investors by engaging in a, quote, "longstanding fraudulent scheme," unquote, to downplay the risks posed to its businesses by necessary climate change regulations.

What is concerning to me overall is this is part of a pattern, private and public, that it is about the role, the knowing, deliberate, and aggressive role of the fossil fuel industry and corporate lobbyists and misleading the public about the scientific consensus on climate change. For decades, there's been a coordinated effort to confuse the American public about dire threats to their threat—to their health and livelihoods. In fact, the fossil fuel industry and lobbyists have funded third-party groups often with misleading names in order to confuse, and so debate where the scientific consensus is established.

So, Dr. Oppenheimer, I have a question. One of these groups it seems was called the Global Climate Coalition, the GCC. I mean, it was an international lobbyist group that opposed action to reduce emissions. Can you tell me anything about this group, including who funded their efforts?

Mr. OPPENHEIMER. The Global Climate Coalition went out of business, first of all, in 2002, I think. So we're talking about history. I was very familiar with the activities of the Global Climate Coalition, because I attended many of the international negotiating sessions that resulted in the first U.N. Framework Convention on Climate Change, and then the Kyoto Protocol and which continued beyond that. They were active players at that time, and appeared to be quite influential with some of the delegations from various countries, particularly those that had strong interest in the fossil fuel industry.

Ms. OCASIO-CORTEZ. So would you say——

Mr. OPPENHEIMER. And they, at that time, themselves, put out some Statements, which were flat out distortions, lies, characterize them in a number of ways about the science, which is what I focus on the most. Go ahead.

Ms. OCASIO-CORTEZ. Thank you. I apologize, it is just because we have limited time.

Mr. OPPENHEIMER. I can't tell you who funded them, because I don't know.

Ms. OCASIO-CORTEZ. Sure. Sure. So it seems here what we have evidence of is that the GCC, the Global Climate Coalition, they knew about the scientific basis of the greenhouse effect. They knew that this was true, but—and they knew that they could not deny the scientific consensus, so instead, their primary goal was to sow doubt. It seems as though here that the Global Climate Coalition was actually largely funded by lobbyist groups and business—and fossil fuel business interests. Does that—does their advocacy seem to align with that?

Mr. OPPENHEIMER. Yes, but let me be a little more specific, to make it clear. I knew several scientists from, for instance, ExxonMobil, at that time. I worked with them closely at the Intergovernmental Panel on Climate Change. They were smart, they were knowledgeable. They never, in the scientific deliberations, ever said a word, which led me to believe they were biased because of their companies. But it seems to me the people who paid them didn't listen to what they said when they went home, because I know those people knew the truth.

Ms. OCASIO-CORTEZ. Yes, absolutely. And it seems from what we have dug up in history, that is absolutely true, is that some of the

first scientists to sound the alarm about climate change came from within ExxonMobil, and once they found out, and once the fossil fuel industry found out from their own scientists that they were responsible, in large part, for climate change, they then started to contract lobbyists groups and third-party organizations.

In fact, in 1988 and 1989, when the Federal Government first started to realize the extent and the damage and the great threat that climate change posed, we moved immediately very quickly to the Kyoto Protocol. It was in 1992. And it seemed like we were well on our way to address this issue, until, according to a report by the Guardian, that former President Bush rejected the Kyoto Protocol, and I quote, "based on input from the Global Climate Coalition," this lobbyist-funded group.

Senator Wirth, did you have any experience with industry attempts to undermine the Kyoto Protocol or any international climate agreements?

Mr. WIRTH. Oh, yes. We thought we were putting together a pretty good agreement. The Kyoto Protocol was the first time to make specific instructions for what would come out of the Earth Summit in 1992. So it would put very real restrictions in various places.

Ms. OCASIO-CORTEZ. So would you say that it is fair to conclude that industry—fossil fuel industry lobbyists are largely responsible for our failure to act on climate change a generation ago?

Mr. WIRTH. Well, it certainly made an enormous contribution. And let me just tell you one story. At one of the major international meetings we were working, and the automobile, American Petroleum Institute, and there was one third very large lobbyist sat right outside of the negotiation room, and it was threatening them. They were clearly trying to bully delegates coming in and out and grabbed them as they came out. It was astonishing to me. Now, this is the first time I had seen this, and it was as if, you know, they had hired real shock troops.

Well, they backed off of this kind of tactic later on, and then they faded out of existence, but they were right into it and, you know, were very, very effective in terms of getting people worries and concerns about who they were and what they were doing, and so on.

Ms. OCASIO-CORTEZ. So these lobbyists were literally sitting right outside?

Mr. WIRTH. Just sitting right outside the door.

Ms. OCASIO-CORTEZ. Watching the lawmakers come in?

Mr. WIRTH. There were three chairs right outside the door. I'll never forget it, you know, and I happened to know, you meet all these guys in the process, and I went over and said, What are you doing? And they sort of laugh and they kind of buttonhole somebody again. You know, it was maybe the low point of all of that, but it was very real.

Ms. OCASIO-CORTEZ. Thank you.

Mr. ROUDA. Congresswoman Ocasio-Cortez, I'm actually going to give you a little bit more time. We are trying to accommodate another member coming.

Ms. OCASIO-CORTEZ. Fabulous.

Mr. ROUDA. So I am going to let the acting ranking member follow you for a minute or two while another member gets here.

Ms. OCASIO-CORTEZ. Thank you. It is my lucky day.

Mr. ROUDA. So you have got approximately 30 seconds to ask one more question.

Ms. OCASIO-CORTEZ. Great. So I have another question here. Dr. Oppenheimer, can you tell us about the climate misinformation campaigns of the American Petroleum Institute?

Mr. OPPENHEIMER. They never showed me their plans, although I do remember that some of them accidentally became public some time during the second Bush Administration. And the name of API appears in many of the groups that have been identified today as members, supporters, funders, and my interactions with the representatives of API at the climate negotiations at, I think, meetings of the plenary sessions of the Intergovernmental Panel on Climate Change made it quite clear that they were there to influence the delegations, which they have a right to do, by the way.

What is unseemly is the kind of thing that Senator Wirth indicated, which I was witness to, too, these people would sit in the meetings, send hand signals sometimes to delegates, and essentially seem to be instructing, I remember in one episode, the delegates from Saudi Arabia.

Ms. OCASIO-CORTEZ. Wow. Well, so it was almost like the lobbyists were the pitcher, and they were kind of giving these hand signals letting the delegates know what they can and cannot vote on based on lobbyists' interests.

Mr. OPPENHEIMER. Absolutely. And it was widely observed and widely known.

Ms. OCASIO-CORTEZ. Shocking.

Mr. WIRTH. It is important to point out, also, if I might, that the companies quickly faded out. No longer could you find companies as members of the Global Climate Coalition, but rather, they were trade groups, the Farm Bureau, the Edison Electric, the American Forest Products, the Chamber of Commerce, so that was their cover group, so those were the dominant members.

Ms. OCASIO-CORTEZ. So they were kind of creating these second and third degree organizations so that they could distance themselves from the political damage of climate denial, but still fully participate and fund it.

Mr. WIRTH. That was always my opinion, yes.

Ms. OCASIO-CORTEZ. One last question with the API. In 1998 the American Petroleum Institute created a multimillion dollar multiyear communications plan to create climate skepticism. Mr. Chairman, I ask unanimous consent to add these documents, which we have obtained, to the record.

Mr. ROUDA. So moved. And you are out of time.

Ms. OCASIO-CORTEZ. Thank you very much.

Mr. ROUDA. With that, I would like to turn it over to the active ranking member, Mr. Higgins from Louisiana, for two minutes.

Mr. HIGGINS. Thank you, Mr. Chairman. Gentlemen, you all have struck me as an excellent cross-section of reflective of the very best of American intellect. Senator, what a wonderful statesman you are. Sir, and you have struck a tone here that has made me smile.

Mr. WIRTH. You're very kind. Thank you.

Mr. HIGGINS. Doctor, and Mr. Loris, your scientific observations have been enlightening. I would just like to—I would just like to challenge this body, and I would like you gentlemen to respond. By what measure would you advise us to move forward with reason and seeking truth within the parameters of our constitutional authority, and in recognition of states' and individual rights, and within that context would you agree that scientific consensus changes through the years what was once considered scientifically unviable is in the next scientific journal found viable. What was once believed to be absolutely true is discovered to be not true.

So within the context of a bipartisan, bicameral Congress with a sworn duty to serve the people and the representative republic of these United States, by what measure may we move forward? And I'll begin with you, Senator.

Mr. WIRTH. Well, I think one of the first things I would do, Mr. Chairman, is to convene some of these other experts who have really dealt directly with this. For example, Chad Holliday, who is the chairman of Shell, may be one of the most reasonable executives you ever met, and he is working very hard to get his colleagues among the very big oil companies to come kind of get on board and what can they do to advance the goals of Paris and get to the 2050 goals. And he is a remarkable man who previously was the head of DuPont and was chairman of the board of the Bank of America before assuming his responsibilities at Shell, which I think is now the largest American oil company.

But anyway, I would have him come. I would have Naomi Oreskes from Harvard come, who has done the best research that I know of in terms of who was trying to influence opinion and how did they do it, and when did they do it? You know, when did they know and when did they do it? She is absolutely terrific. It is getting people like that, at some length, so you have a chance to talk to. You know, these five-minute things are great, I understand that, and——

Mr. HIGGINS. I'm quite sure that with the chairman's leadership and the ranking member for whom I sit today with their leadership, that's the formula we shall seek, and perhaps the gentleman can answer questions in writing. Mr. Chairman, my time has expired.

Mr. ROUDA. Thank you. At this time I would like to recognize from the state of Kentucky, Congressman James Comer, also the ranking member of this subcommittee. Welcome.

Mr. COMER. Thank you, Mr. Chair, and I know that this committee has gone long, and I just wanted to clarify something from the full committee meeting this morning with respect to some statements that were made regarding the questions that I asked Senator Kerry.

You know, I don't think anyone on our side denies climate change. We just basically had questions about how we're going to pay for this legislation. That was the first part of the question that I wanted to ask Secretary Kerry and Senator Hagel. And I didn't get to the next part of the question, or, I guess, rather, statement that I wanted to make was that with respect to agriculture and coal, two industries that are huge in my Southern and Western

Kentucky District of Kentucky. With respect to coal, I don't disagree that the natural gas is cheaper than coal today.

I just feel that we need to have a diverse energy portfolio in America, and I believe that there are negative implications that are affecting communities that a lot of people in Washington don't realize, with respect to agriculture.

And with all due respect to John Kerry, he was talking about crop yields and things like that. I doubt he's grown a lot of crops in his lifetime, and I'm a farmer, former Commissioner of Agriculture. I believe that every year, yields have significantly increased, and I believe agriculture doesn't get the credit it deserves in making efforts to reduce its carbon footprint.

We in agriculture want to pass the land to the next generation in better shape than it was when we received it. And those are some of the statements that I wanted to make that I didn't have time to make today because we were arguing over the cost of the first proposal that's received a lot of attention with respect to climate change the Green New Deal.

But I look forward, ranking member and chairman, to be able to have dialog on this issue. I do think it is an important issue, but I think that it has been heavily politicized in a way that is creating unrealistic expectations for people that believe passionately in the issue. So, hopefully, we'll have good dialog as we move forward, and we'll be able to address the concern, and figure out a realistic path forward in a way to pay for any major proposed changes that don't put the United States at a competitive disadvantage.

There was a lot of knocking by Senator Kerry on President Trump's leadership. One thing that I think the American people support, or at least they do in my district, is the President's leadership in trying to put America back on a level playing field to create manufacturing jobs, to bring back manufacturing jobs.

One reason we lost manufacturing jobs to China and other countries is they have much more lenient environmental laws, and when you poll the American people, the issue that consistently rises to the top of their concern, whether they're liberal or conservative, whether they're rich or poor is the economy. So I applaud the President's leadership in trying to do that, and I look forward to having open dialog with both sides as we come to solutions that are affordable and achievable for the American public. With that, Mr. Chairman, I thank you and yield back.

Mr. WIRTH. Mr. Chairman?

Mr. ROUDA. Yes.

Mr. WIRTH. Can I just comment very briefly on this, the two points that are made at the beginning? I think those are grounds for two really good hearings going back to the question of where you go from here. One, the impact on coal communities is something that is very seldom I think really drilled down on. People are like only so many jobs for coal miners, but that's not the point. There are truck drivers and restaurants and whole communities that are dependent upon this, and how do we make that transition? I don't think we know how to do that, and I think that's a real contribution that can be made by this committee.

Similarly, in the area of agriculture, there has been much talk about the impact that agriculture can have in working on the cli-

mate issue, and sequestering carbon and so on, but it has been skin deep in terms of, I think, for the most part, the analysis. And so that's a second area that I think you can very constructively delve into and, you know, come up with a set of recommendations that really haven't been as deeply probed as I think they have to be. So thank you, Mr. Chairman.

Mr. OPPENHEIMER. Could I add to that, Mr. Chairman?

Mr. ROUDA. I'm sorry, Dr. Oppenheimer, is that you?

Mr. OPPENHEIMER. With regard to the two points you made about coal and agriculture also, and I greatly support what Senator Wirth said, globally, that includes the United States, also. I don't know about the situation in Kentucky. Crop yields have actually slowed. The growth in crop yields is not what it was several decades ago, and it slowed because the benefits of the green revolution have basically run out, they have spread worldwide. And in addition, there's another headwind, that is, that there's evidence that the climate changes that have occurred have marginally started to reduce crop yields of the major cereal grains in many areas. I'm not asserting that it has affected Kentucky yet. It is to be of concern for the future.

So we welcome the engagement of farmers both in the issue of how to adapt to these changes and how they can contribute to enhanced carbon sequestration, for instance.

The other is, you know, it is perfectly plausible that a technology, technologies that exist, to capture carbon dioxide emissions from coal burning power plants and scrub them and sequester them, could be part of the long-term solution.

So I think we ought to work together to try to figure out which of these opportunities are the most economical, which will solve the problem across the board, which will bring co-benefits of reduced air pollution, and, you know, I don't think we need to write anything off completely.

Mr. ROUDA. Thank you, Dr. Oppenheimer, and thank you Senator Wirth, and thank you Ranking Member Comer for your comments, as well. At this time I would like to recognize the gentleman from California, Congressman Gomez, for five minutes.

Mr. GOMEZ. Thank you, Mr. Chairman. In light of this history of climate denials, I'm deeply concerned about President Trump's dangerous statements on climate change, and how they can lead to another 30 years of inaction on this issue. It might come as a surprise to many that President Trump did not always hold these anti-climate change beliefs. In 2009, along with Deepak Chopra, Ben and Jerry, and his three children, the current President signed on to a full-page ad in the New York Times calling on President Obama and Congress to pass legislation restricting greenhouse gas emissions. It read, quote, "We support your effort to ensure meaningful and effective measures to control climate change, an immediate challenge facing the United States and the whole world today." It goes on, quote, "If we fail to act now it is scientifically irrefutable that there will be catastrophic and irreversible consequences for humanity and our planet."

But as we sit here today, the President regularly goes on unhinged and on rants about climate change that could be pulled

straight out of the industry playbook, making statements that are clearly scientifically inaccurate, to say the least.

Dr. Oppenheimer, I would like to run a couple of the President's statements by you to assess their validity. Leading up to and during his campaign, the President dubbed climate change, quote, "a hoax," "a total hoax," "an expensive hoax," and "a total and very expensive hoax." I guess we got his point. He believes it is a hoax. Is climate change a hoax, Dr. Oppenheimer?

Mr. OPPENHEIMER. Decidedly not.

Mr. GOMEZ. The President has accused climate scientists as having, quote, "a political agenda." Are your scientific opinions and those of your colleagues based on a political agenda?

Mr. OPPENHEIMER. A good scientist can separate his political and personal biases from his scientific understanding, his or her. If you can't do that, you shouldn't be a scientist. My colleagues work hard to do that.

Mr. GOMEZ. Is to say the world is round, and again it circles the sun a political agenda?

Mr. OPPENHEIMER. Not as far as I can tell.

Mr. GOMEZ. Science. In an interview with 60 Minutes in October 2016, the President said, though he no longer thinks global warming is a hoax, quote, "I think something's happening, something is changing, and it will change back again." Wow, he changes his mind a lot.

Dr. Oppenheimer, if we do not take any action to decrease our emissions is it likely that climate change will change back again, that it won't occur?

Mr. OPPENHEIMER. No. The climate does vary. It does vary due to many factors, including variations in earth's orbit, which are very slow, and variations in the sun's intensity, which are small, however. What we know now is that human beings have taken control of the climate machine, so to speak. The largest variations in climate are going to be the global warming trend for as far in the future as we can see.

Mr. GOMEZ. Thank you. In the same interview, this was a doozy of an interview referring to sheets of ice melting into the ocean in Greenland, the President said, You don't know whether that was—that would have happened with or without man. Dr. Oppenheimer, how sure are scientists that these changes in our climate are due to human activity?

Mr. OPPENHEIMER. We are sure that most of the climate change over the past 50 years is due to human activity. With regard to the ice sheets, they're complicated. Certain parts of them are clearly melting due to climate change, due to the human-induced climate change. With other parts, the changes are not fully understood by us.

Mr. GOMEZ. Thank you. Dr. Oppenheimer, this kind of rhetoric, I believe, is really designed to mislead the American people, and will delay critical congressional action in order to maintain the profits of polluters.

Senator Wirth, would you agree that in order to address the climate change at a global level, the United States must play a leading role?

Mr. OPPENHEIMER. No question about it, and the world at every one of these—every meeting that I went to over a 30-year period of time, you walk into a room, the first question you can feel among your colleagues is what does the United States think about this? That was so important. It was thrilling to be a U.S. Representative, but also you recognize the enormous responsibility the United States had as we had the research, we had the capacities to lead and to persuade and to become engaged. It was a wonderful time, and we have to get back to that again.

Mr. GOMEZ. I agree with you. I believe that the U.S. role and its leadership on this issue can't be overstated.

Before I yield, Mr. Chairman, I would like to ask for a unanimous consent to regarding the ad that I mentioned. It reads, "Dear President Obama and the U.S. Congress, Tomorrow leaders from 192 countries will gather at the U.N. Climate Change Conference in Copenhagen to determine the fate of our planet," and it was signed by Donald J. Trump, Chairman and President, Donald J. Trump, Jr., Eric Trump, as well as Ivanka Trump and the Trump organization.

Mr. ROUDA. So moved.

Mr. GOMEZ. Thank you so much. I yield back.

Mr. ROUDA. I would like to thank our witnesses for coming today. I know it has been a long day with a few interruptions along the way, as well.

Without objection, all members will have five legislative days within which to submit additional written questions for the witnesses to the chair, which will be forwarded to the witnesses for their response. I ask our witnesses to please respond as promptly as you are able.

I would also like to thank my colleagues here for attending this hearing, this very important hearing. This is a first of three phases. Today was focused on the historical evidence at hand. We'll also be talking about the current situation, as well as the future and the opportunity to address climate change. I am encouraged that I do believe that smart capitalism and good government can provide the innovation and advancement to address these issues, and I am looking forward to working with the colleagues across both parties and accomplishing that outcome. With that being said, this hearing is adjourned. Thank you.

[Whereupon, at 4:45 p.m., the subcommittee was adjourned.]