

**CREATING A CLIMATE RESILIENT AMERICA:
STRENGTHENING THE U.S. FINANCIAL SYSTEM
AND EXPANDING ECONOMIC OPPORTUNITY**

HEARING
BEFORE THE
**SELECT COMMITTEE ON THE
CLIMATE CRISIS**
HOUSE OF REPRESENTATIVES
ONE HUNDRED SIXTEENTH CONGRESS
SECOND SESSION

HEARING HELD
OCTOBER 1, 2020

Serial No. 116-19



www.govinfo.gov
Printed for the use of the Select Committee on the Climate Crisis

U.S. GOVERNMENT PUBLISHING OFFICE

42-185

WASHINGTON : 2020

SELECT COMMITTEE ON THE CLIMATE CRISIS

ONE HUNDRED SIXTEENTH CONGRESS

KATHY CASTOR, Florida, *Chair*

BEN RAY LUJÁN, New Mexico
SUZANNE BONAMICI, Oregon
JULIA BROWNLEY, California
JARED HUFFMAN, California
A. DONALD McEACHIN, Virginia
MIKE LEVIN, California
SEAN CASTEN, Illinois
JOE NEGUSE, Colorado

GARRET GRAVES, Louisiana,
Ranking Member
MORGAN GRIFFITH, Virginia
GARY PALMER, Alabama
BUDDY CARTER, Georgia
CAROL MILLER, West Virginia
KELLY ARMSTRONG, North Dakota

ANA UNRUH COHEN, *Majority Staff Director*
MARTY HALL, *Minority Staff Director*
climatecrisis.house.gov

CONTENTS

STATEMENTS OF MEMBERS OF CONGRESS

	Page
Hon. Kathy Castor, a Representative in Congress from the State of Florida, and Chair, Select Committee on the Climate Crisis:	
Opening Statement	1
Prepared Statement	3
Hon. Garret Graves, a Representative in Congress from the State of Lou- isiana, and Ranking Member, Select Committee on the Climate Crisis:	
Opening Statement	4

WITNESS: PANEL 1

Hon. Rostin Behnam, Commissioner, Commodity Futures Trading Commis- sion	
Oral Statement	5
Prepared Statement	8

WITNESSES: PANEL 2

Joanna Syroka, Senior Underwriter and Director of New Markets, Fermat Capital Management, LLC	
Oral Statement	30
Prepared Statement	32
Rich Powell, Executive Director, ClearPath	
Oral Statement	35
Prepared Statement	36
Maggie Monast, Director of Working Lands, Environmental Defense Fund	
Oral Statement	42
Prepared Statement	44

APPENDIX

Questions for the Record from Hon. Kathy Castor to Hon. Rostin Behnam	64
Questions for the Record from Hon. Kathy Castor to Joanna Syroka	66
Questions for the Record from Hon. Kathy Castor to Maggie Monast	69

**CREATING A CLIMATE RESILIENT AMERICA:
STRENGTHENING THE U.S. FINANCIAL SYSTEM
AND EXPANDING ECONOMIC OPPORTUNITY**

THURSDAY, OCTOBER 1, 2020

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON THE CLIMATE CRISIS,
Washington, DC.

The committee met, pursuant to call, at 1:31 p.m., via Webex, Hon. Kathy Castor [chairwoman of the committee] presiding.

Present: Representatives Castor, Bonamici, Brownley, Huffman, Levin, Casten, Graves, Palmer, Carter, and Miller.

Ms. CASTOR. The committee will come to order.

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

Good afternoon, and thank you all for joining this remote hearing.

As a reminder, members participating in a hearing remotely should be visible on the camera throughout the hearing.

As with in-person meetings, members are responsible for controlling their own microphones. Members can be muted by staff only to avoid inadvertent background noises.

In addition, statements, documents, or motions must be submitted to the electronic repository at sccc.repository@mail.house.gov.

Finally, members and witnesses experiencing technical problems should inform committee staff immediately if that happens.

I now recognize myself for 5 minutes for an opening statement.

Well, whether it is extreme heat, intense flooding, stronger storms, or relentless wildfires, the climate crisis continues to pose a severe threat to America's economy and the pocketbooks of all Americans.

Year after year, we have seen how climate change hurts businesses, it strains resources across the nation, and it harms workers. And we have seen the impact it has on budgets of local governments, who don't always have the resources to recover from worsening disasters, and on the budget of the U.S. government, as we are forced to provide greater amounts of disaster aid in the wake of calamity.

The risks and harm of climate change are hurting families, farmers, small business owners, as well as workers in manufacturing and the energy sector. The changing climate is especially harming working-class households and people of color, the same folks who have been historically marginalized through discriminatory practices and underinvestment.

It is also putting financial institutions at risk. Just last month, the Commodity Futures Trading Commission issued a landmark report describing these risks and giving lawmakers and financial regulators actionable recommendations on how to mitigate the growing risks.

Climate change is affecting insurance markets, and it is making lending costlier. It is making it harder for frontline communities to afford the protection and peace of mind that they deserve. And it is hurting farmers and agricultural workers.

The writing is on the wall. Financial markets, federal regulators, and business leaders recognize the risks posed by climate change, but they are also publicly optimistic about the opportunities to solve the climate crisis, by directing capital towards climate-smart investments and making our economy more resilient and stronger than ever.

Just today, 55 international financial institutions, including U.S.-based MetLife and Amalgamated Bank, released a framework for setting specific climate goals for mortgages, bonds, and other asset classes in their portfolios.

Our workers, our financial institutions, and our small businesses are looking to Congress now for solutions. So, as we find ways to bounce back from the harm done by COVID-19, we must build back our economy so that it is better and stronger than ever. And it starts by investing in long-term solutions—lasting solutions that will protect workers, strengthen our financial systems, and ensure economic growth.

These solutions are climate solutions. Investing in a resilient clean energy economy will put Americans back to work through millions of good-paying, life-sustaining jobs. It will strengthen the middle class and provide justice for Black and Brown Americans. And it will make our financial institutions stronger and more resilient.

By bringing transparency to climate-related risks, we will be able to build a 21st-century economy that withstands the test of time. Climate solutions give us a chance to rebuild our economy and our infrastructure, making them stronger, more resilient, more grounded in environmental justice. We can create the jobs of the future, at a time when our nation desperately needs them. But we have to act with urgency, and we have to follow the science.

States and local communities are already leading the way. For example, California has created a special task force on climate risk and insurance, while cities in my own state of Florida have formed regional climate compacts to pool resources and knowledge. And, along the Mississippi River, communities have come together to address flood and drought risks that threaten farmers. They are finding innovative solutions in collaboration with insurers, catastrophe risk modelers, and investors.

So now Congress must step up. We must enact policies that give communities the tools and resources they need. We must ensure their access to climate data so that they can make informed decisions. We must help them overcome barriers to private investment in climate resilience and protect investors from hidden sources of climate risks.

The science is in, the risks are clear, and the incredible opportunities for progress are within our reach. It is up to us what to do next.

I yield back.

And now I recognize Ranking Member Graves for a 5-minute opening statement.

[The statement of Ms. Castor follows:]

Opening Statement of Chair Kathy Castor

Hearing on “Creating a Climate Resilient America: Strengthening the U.S. Financial System and Expanding Economic Opportunity”

Select Committee on the Climate Crisis

October 1st, 2020

As prepared for delivery

Whether it’s extreme heat, intense flooding, stronger storms, or relentless wildfires, the climate crisis continues to pose a severe threat to America’s economy and the pocketbooks of all Americans. Year after year, we’ve seen how climate change hurts businesses, strains resources across the nation, and harms workers. And we’ve seen the impact it has on the budgets of local governments, who don’t always have the resources to recover from worsening disasters—and on the budget of the U.S. government, as we are forced to provide greater amounts of disaster aid in the wake of calamity.

The risks and harms of climate change are hurting families, farmers, and small business owners, as well as workers in manufacturing and the energy sector. The changing climate is especially harming working-class households and people of color—the same folks who have been historically marginalized through discriminatory practices and underinvestment.

It’s also putting our financial institutions at risk. Just last month, the Commodity Futures Trading Commission issued a landmark report, describing these dangers and giving lawmakers and financial regulators actionable recommendations on how to mitigate the growing risks. Climate change is affecting insurance markets and making lending costlier. It’s making it harder for frontline communities to afford the protection and peace of mind they deserve. And it’s hurting our farmers and agricultural workers.

The writing is on the wall. Financial markets, federal regulators, and business leaders recognize the risks posed by climate change, but they’re also publicly optimistic about the opportunities to solve the climate crisis—by directing capital toward climate-smart investments and making our economy more resilient and stronger than ever. Just today, 55 international financial institutions, including U.S.-based MetLife and the Amalgamated Bank, released a framework for setting specific climate goals for mortgages, bonds and other asset classes in their portfolios.

Our workers, our financial institutions, and our small businesses are looking to Congress for solutions. So, as we find ways to bounce back from the harm done by COVID-19, we must build back our economy so that it’s better and stronger than ever. And it starts by investing in long-term solutions—lasting solutions that will protect workers, strengthen our financial systems, and ensure economic growth.

Those solutions are climate solutions. Investing in a resilient clean energy economy will put Americans back to work through millions of good-paying, life-sustaining jobs. It will strengthen our middle class and provide justice for Black and Brown Americans. And it will make our financial institutions stronger and more resilient to growing climate impacts.

By bringing transparency to climate-related risks, we’ll be able to build a 21st-century economy that withstands the test of time. Climate solutions give us a chance to rebuild our economy and our infrastructure, making them stronger, more resilient, and more grounded in environmental justice. We can create the jobs of the future at a time when our nation desperately needs them—but we need to act with urgency and unite behind the science.

States and local communities are already leading the way. For example, California has created a special task force on climate risk and insurance, while cities in my own state of Florida have formed regional climate compacts to pool together

resources and knowledge. And along the Mississippi River, communities have come together to address flood and drought risks that threaten farmers, finding innovative solutions in collaboration with insurers, catastrophe risk modelers, and investors.

Now Congress must step up and lead.

We must enact policies that give communities the tools and resources they need to become resilient and mitigate climate risks. We must ensure their access to climate data, so they can make informed decisions about how to sustain their local economies and build lasting growth. And we must help them overcome barriers to private investment in climate resilience and protect investors from hidden sources of climate risks.

The science is in. The risks are clear. And the incredible opportunities for progress are within our reach. It's up to us what to do next.

Mr. GRAVES. Okay. Thank you, Madam Chair. Thank you for hosting this hearing today, and I want to thank the Commissioner for joining us.

Madam Chair, you mentioned a report that the Commission recently released, and there are a number of things in there that I think are important issues that the Commission has raised in regard to risk and risk assessment and mitigation.

I also wonder about looking at risk holistically and whether or not the report should actually be even more encompassing.

And I will give some examples. There is no question, as, Madam Chair, your state and my state well know, of the risk of sea rise and hurricane intensity and other challenges that our states have experienced and may experience with greater frequency in the future. But I think that, as we look at the future, we also have to think about the volatility, the risk associated with some of the strategies that are being carried out to mitigate the very threat that we are discussing today.

And, Madam Chair, you talked about the State of California. Seeing things like blackouts and brownouts in a state, that is extraordinary risk. How do you have a business, how do you take care of your family, how can you even live there—as I understand, we have seen a net departure of families from California—if you are having rolling blackouts and brownouts?

How can we provide business certainty and encourage folks to create new small businesses if we are having double the electricity cost in California than they do, for example, in my home state of Louisiana?

How can we provide certainty for our businesses and for our families that are trying to keep their homes heated and cooled if, not just the blackouts and brownouts, but if we are subjecting ourselves to the volatility of energy sources or energy technology from China, where we recently saw during the coronavirus pandemic how they were using PPE effectively as warfare against the United States and other countries around the world?

Thankfully, just today, the President has issued an executive order related to critical minerals. And, as we move in this direction of a cleaner energy portfolio and cleaner energy resources, something that all of us share, that we don't play into the hands of China by subjecting ourselves to dependence upon them, where they are able to continue just pulling these strings and causing problems and volatility in the United States.

I think, also, the report scope—how do you actually address certainty, or how do you provide certainty, when the reality is that—

well, the United States has been the world leader in reducing emissions. For every 1 ton of emissions we have reduced, China has increased by 4. Therefore, we don't actually even have control over our own destiny, our own future, if we are going to have irresponsible parties, like China, trying to pretend as though they are a developing nation, yet spending trillions of dollars on their defense and on their investments around the globe, adversely affecting the United States, our European allies, our Pacific allies, and others. There is all sorts of uncertainty that I think poses an even greater threat or a greater risk to the United States than the limited scope that the Commission has looked at.

And I want to say, look, I agree with many of the things the Commission has identified, but I believe we need to look even broader and focus on the things that we truly have control over.

Madam Chair, one of those is something you and I share, of course, and that is the resiliency investments. And if we are going to move forward on resiliency, if we are going to move forward in deploying renewable energy projects, we have to look at our regulatory structure that is currently impeding those very projects for resiliency. We have to look at the regulatory structure that is impeding our efforts to try to build new renewable wind projects and solar arrays and other things, again, that I think we all share.

So I think we need to look more broad. I am glad we are having this hearing today, and I look forward to hearing from the two panels of witnesses.

Ms. CASTOR. Thank you very much.

Without objection, members who wish to enter opening statements into the record may have 5 business days to do so.

Now I would like to welcome our witnesses.

We will hear from a range of experts on recent findings and emerging opportunities to address climate threats to financial systems and the Nation's economic vitality.

We will have two panels. On the first panel, we will hear from Rostin Behnam, a Commissioner for the Commodity Futures Trading Commission, where he has served since September of 2017.

As sponsor of the CFTC's Market Risk Advisory Committee, Commissioner Behnam convenes leading market experts and public consumer groups to discuss the timeliest issues to evolving market structures and movement of risk across clearinghouses, exchanges, intermediaries, market makers, and end users.

Commissioner Behnam convened the Climate-Related Market Risk Subcommittee to provide a report to the MRAC on climate-related financial and market risks.

Without objection, the witness's written statement will be made part of the record.

With that, Commissioner Behnam, welcome. You are now recognized to give a 5-minute presentation of your testimony.

STATEMENT OF THE HONORABLE ROSTIN BEHNAM, COMMISSIONER, COMMODITY FUTURES TRADING COMMISSION

Mr. BEHNAM. Thank you, Chair.

Chair Castor, Ranking Member Graves, and members of the committee, it is an honor to appear before you today to discuss creating a climate resilient America.

Before I begin, please recognize that the views I express today are my own and do not represent the views of the CFTC, its staff, or my fellow Commissioners.

The critical work of this committee could not be timelier. As of Tuesday, wildfire activity continued in 10 Western States, and the Gulf Coast is still reeling from the damage of Hurricanes Laura and Sally. The impact of wildfires on air quality have led to the use of the word “airpocalypse” to describe high particulate pollution in parts of the United States.

These are all manifestations of the physical risks associated with climate change and extreme weather events. But how is an airpocalypse or climate risk generally accounted for in the financial markets, and why is a financial regulator in the right position to move this conversation forward?

I serve as a Commissioner of the Commodity Futures Trading Commission, the primary U.S. derivatives markets regulator. Derivatives are critical risk management and price discovery tools that touch nearly every corner of our economy, from the price of bread to the price at the pump.

With a previous background in financial services policy and agricultural policy, the multitude of risks related to climate change faced by farmers, ranchers, and the entire value chain has been at the forefront of my thinking.

At the CFTC, when we think about financial market risk, we think about scenarios that are extreme but plausible. What if there were years in which wildfires impaired the economy of the Western States, record flooding in the Midwest shocked the agricultural engine of the country, and Gulf Coast and East Coast hurricanes destroyed coastal property? And what if these events happened in quick succession or at the same time? Beyond the implications for our lives, health, and national security, would our economy and the financial markets be able to withstand the shock?

The CFTC has active and insightful federal advisory committees which provide outside input and make recommendations to the Commission. In June of 2019, the Market Risk Advisory Committee, which I sponsor, held a public meeting on the relationship between climate change and financial market risk. I left that informative day with three fears confirmed: Climate risk manifests in the financial markets, the U.S. financial regulators were behind their global counterparts, and much more work needed to be done.

To more fully focus on this issue, I immediately began the process of forming the Climate-Related Market Risk Subcommittee. I am grateful to each of the 34 subcommittee members—professionals from multiple sectors of the economy and financial markets—for their commitment to the effort and their willingness to tackle a difficult issue during an unprecedented time.

I could not have been more fortunate with Dr. Bob Litterman as the subcommittee’s chair, an economist with expertise in finance and risk management, who has more recently focused his endeavors on climate change.

When I asked for a consensus document, I knew that was a high bar. But I was very pleased when, earlier last month, the subcommittee voted unanimously, 34 to 0, to approve the report.

I would also like to take a moment to recognize my chief of staff, David Gillers, who has shepherded this initiative, and thank John Dunfee, Laura Gardy, and Alicia Lewis.

“Managing Climate Risk in the U.S. Financial System” is a first-of-its-kind document. A few of the critical findings of the report: climate change poses a major risk to the stability of the U.S. financial system and to its ability to sustain the American economy; U.S. financial regulators should move urgently and decisively to measure, understand, and address the risk; and the financial system can be a catalyst for investment that accelerates economic resilience and the transition to a net-zero emissions economy.

The report provides 53 policy recommendations, establishing at the outset that policies should be flexible, open-ended, and adaptable in real time, based on close and iterative dialogue with the private sector.

Second, the report recognizes that climate change already has placed disproportionate burdens on low- and moderate-income households and historically marginalized communities. It is critical that any policy does not make this problem worse.

The first recommendation of the report is also the one that requires congressional action. The U.S. should establish a price on carbon. The report highlights that this is the single most important step to manage climate risk and drive appropriate allocation of capital.

As Dr. Litterman has pointed out on several occasions, financial markets do an amazing job of allocating capital in the direction of the incentives that they are given. When incentives are appropriate, they lead to innovation, improvements in health and safety, and quality of life.

In the absence of a price on carbon, there is still an urgent role for regulators. The report points out that financial regulators should actively promote, and in some cases, require better understanding, quantification, disclosure, and management of climate-related risk by financial institutions and other participants. The report argues for critical action regarding disclosures, stress testing, scenario analysis, and governance.

Another few recommendations of the report is international collaboration and harmonization. When it comes to pricing carbon, disclosures, stress testing, and scenario analysis, it is critical that we approach this together with our international partners.

Perhaps my favorite chapter is the last, which focuses on opportunities in financing the net-zero transition. The report makes the case that structural changes and market innovations can expand capital flows to sustainable finance solutions, creating significant employment opportunities.

I will end my remarks with the observation from the report that captures the seriousness and urgency at hand: a world wracked by frequent and devastating shocks from climate change cannot sustain the fundamental conditions supporting our financial system.

The good news, though, is that we have virtually all of the tools that we need to start our work. With the exception of a price on carbon, existing legislation already provides U.S. financial regulators with wide-ranging and flexible authorities that could be used to start addressing financial climate-related risk now.

I strongly believe that all congressional committees with relevant oversight jurisdiction should consider the policy recommendation.

As one observer has noted, “We missed the subprime mortgage crisis, which led to the Great Recession. We missed the COVID–19 crisis, which has led to catastrophic loss of human life and economic shock. Let us not miss the climate crisis.”

Thank you for your time, and I am happy and look forward to answering your questions.

[The statement of Mr. Behnam follows:]

Prepared Statement of Rostin Behnam

Commissioner, Commodity Futures Trading Commission

Before the House Select Committee on the Climate Crisis

“Creating a Climate Resilient America: Strengthening the U.S. Financial System and Expanding Economic Opportunity”

Thursday October 1, 2020 1:30 p.m.

Chair Castor, Ranking Member Graves, and members of the committee, it is an honor to appear before you today to discuss creating a climate resilient America through strengthening the U.S. financial system and expanding economic opportunity. Before I begin, please recognize that the views I express today are my own and do not represent the views of the CFTC, its staff, or my fellow Commissioners.

The critical work of this committee and the topic of today’s hearing could not be timelier. As of Tuesday, wildfire activity continued in 10 western states where 70 large fires have burned more than 3.9 million acres,¹ and the Gulf Coast is still reeling from the damage of Hurricanes Laura and Sally. Data from NASA satellites confirms that 2020 fire activity in California, Oregon, and Washington State has broken several records in both size and scope.² In particular, a review of the data collected since 1997 indicates that 2020 is the highest year of fire carbon emissions for California, and, notably, this figure only reflects activity through September 11th.³

The impact of wildfires on air quality has led to the use of the word “airpocalypse” to describe the dangerously high particulate pollution in parts of the United States, a term that in the past has only applied to other countries.⁴ The impact of airpocalyptic conditions on human health and welfare is indisputable. Even as this country continues to battle COVID–19 with its own litany of impacts on respiratory function, Oregon hospitals recently reported a 10% increase in emergency room visits for breathing problems related to air quality.⁵

These are all manifestations of the physical risks associated with changing climate and extreme weather events. But how is an “airpocalypse,” or climate risk generally, understood and accounted for in the financial markets? And, why is a financial regulator in the right position to move this conversation forward? Before I answer these questions, I’d like to provide a bit of background.

Background and Beginnings

I serve as a Commissioner at the Commodity Futures Trading Commission, or the CFTC. The CFTC is a bipartisan, five-member independent federal regulatory agency that serves as the primary U.S. derivatives market regulator. Derivatives, which include futures, options, and swaps, are financial contracts that derive their value

¹*Fire Information*, NATIONAL INTERAGENCY FIRE CENTER, <https://www.nifc.gov/fireInfo/nfn.htm> (last visited Sept. 29, 2020).

²*Historic Fires Devastate the U.S. Pacific Coast*, NASA EARTH OBSERVATORY, <https://earthobservatory.nasa.gov/images/147277/historic-fires-devastate-the-us-pacific-coast> (last visited Sept. 29, 2020).

³*Id.*

⁴Blacki Migliozi, Scott Reinhard, Nadja Popovich, Tim Wallace, and Allison McCann, *Record Wildfires on the West Coast are Capping a Disastrous Decade*, N.Y. TIMES (Sept. 24, 2020), <https://www.nytimes.com/interactive/2020/09/24/climate/fires-worst-year-california-oregon-washington.html>.

⁵*Id.*

from an underlying asset, ranging from a variety of commodities including wheat, natural gas, gold, interest rates, and bitcoin. Derivatives are critical risk management and price discovery tools that touch nearly every corner of our economy, from the price of bread to gas at the pump.

The CFTC's mission is to foster open, transparent, competitive and financially sound markets; prevent and deter price manipulation and other disruptions to market integrity; and to protect all market participants and the public from fraud, manipulation, and abusive practices.⁶ When the CFTC was established as an independent agency in 1974, most futures trading took place in the agricultural sector.⁷ Today, the portfolio of derivatives is much more diverse, with the vast majority of the contracts being financial in nature, including global currencies, interest rates, and financial indices. Like the contracts themselves, the market participants also vary, including banks, institutional investors, manufacturers, farmers and ranchers, and energy companies.

With a previous background as a congressional aide focused on both financial services policy and agricultural policy, including the 2014 Farm Bill,⁸ the multitude of risks related to climate change faced by farmers, ranchers, and the entire value chain has been at the forefront of my thinking since joining the Commission in 2017. Weather and climate present the greatest, consistent—yet uncertain—risks to the agricultural economy and rural communities. More frequent and more severe extreme weather events, from flooding, hurricanes, and tornadoes, to wildfires have presented a growing set of longer term challenges that require a different way of assessing long-term risk management and the policies to support it.

At the CFTC, when we think about financial market risk we are required to think about scenarios that are “extreme but plausible.” What if there were years in which wildfires impaired the economy of the Western states, record flooding in the Midwest shocked the agricultural engine of the country, and Gulf Coast and East Coast Hurricanes destroyed coastal property? And what if these events happened in quick succession, or, even worse, but still plausible, *and this is key*, what if they happened at the same time? Beyond the implications for our lives, health, safety, and national security, would our economy and the financial markets that underpin it be able to withstand such withering and debilitating shock? And, more to the point, what could or should policy makers do about it?

Like many other agencies and departments, the CFTC has active and insightful Federal Advisory Committees, authorized under the Federal Advisory Committee Act,⁹ which provide outside input and make recommendations to the Commission on regulatory and market issues. Our advisory committees are comprised of industry participants, subject matter experts, and stakeholders in the markets we oversee. I have proudly served as the sponsor of the Market Risk Advisory Committee (MRAC) since I arrived at the Commission. During my tenure, the MRAC has convened to address a variety of matters, including the impending transition away from the London Interbank Offered Rate, more commonly known as Libor, market structure issues, and clearinghouse risk issues.

The MRAC advises the Commission on matters relating to evolving market structures and movement of risk across the derivatives markets. It examines systemic issues that threaten the stability of the derivatives and other financial markets. The MRAC is therefore perfectly situated to explore the links between climate change and financial market risk, and what role policy makers should and could play to mitigate these more extreme, emerging risks, specifically with respect to financial market participants.

In June of 2019, the MRAC held a public meeting on the relationship between climate change and financial market risk.¹⁰ I left that informative day with three fears confirmed: (1) climate risk manifests in the financial markets in multiple and sometimes amplifying ways; (2) the U.S. financial regulators were far behind their global counterparts; and (3) much more work needed to be done to examine the potential risks that might demand a policy response. It turns out that central banks and financial regulators across the world have been working on this issue for years, but in the U.S. we are only at the very nascent stages. I'd like to recognize the leading work of the Bank of England in this space, and a number of excellent papers

⁶ See Section 3 of the Commodity Exchange Act, 7 U.S.C. 5.

⁷ About the Commission, COMMODITY FUTURES TRADING COMMISSION, <https://www.cftc.gov/About/AboutTheCommission> (last visited Sept. 29, 2020).

⁸ Agricultural Act of 2014, Pub. L. No. 113–79, 128 Stat. 649 (2014).

⁹ Federal Advisory Committee Act (“FACA”), as amended, 5 U.S.C. App. 2.

¹⁰ Information on all of the MRAC meetings, including press releases, archived webcasts, and presentation materials are available at https://www.cftc.gov/About/CFTCCcommittees/MarketRiskAdvisoryCommittee/mrac_meetings.html.

they have authored on this topic.¹¹ Additionally, the Bank for International Settlements, the Network for Greening the Financial System, and the Financial Stability Board's Task Force on Climate-related Financial Disclosures have also done superb work in this space.¹²

To more fully focus on the issues and ensure we were able to gather the right mix of stakeholders, I immediately began the process of forming the Climate-Related Market Risk Subcommittee of the MRAC. After unanimously confirming its formation and charge, and soliciting the public for membership nominations,¹³ the CFTC unanimously confirmed its membership in November, 2019.¹⁴ I charged the Subcommittee with exploring the relationship between climate risk and financial market risk, and asked that it produce a report with findings and recommendations to address the risk.

The Subcommittee membership includes 34 professionals from banking, asset management, insurance, a credit rating company, agricultural and energy markets, data providers, environmental groups, and academia, singularly focused on climate change, adaptation, public policy, and finance. Identifying a chairperson of the Subcommittee was a critical step, and I could not have been more fortunate with Dr. Bob Litterman's willingness to serve as the Subcommittee chair.

Dr. Litterman's professional career has spanned more than four decades and across many disciplines, including economics, finance, and risk management. Dr. Litterman spent 23 years at Goldman, Sachs & Co., where he served in research, risk management, and investments, including the head of the firm-wide risk function, and as the co-developer of the Black-Litterman Global Asset Allocation Model with Dr. Fischer Black. After leaving Goldman, Bob became a founding partner at Kepos Capital, a New York City based macro investment firm, shifting much of his focus to addressing the risks of climate change. Concerned with the inadequate manner in which society addressed climate risk, Bob, as an economist and risk manager, has strongly advocated for appropriate incentives to reduce carbon emissions, through a price on carbon. This unique mixture of expertise in finance, risk management, economics, and climate change risk made Bob the perfect candidate to lead the effort, and we should all be grateful to him for his service.

The Subcommittee represents a diverse and broad coalition of stakeholders that includes some of the sharpest minds on climate related financial market risk and also represents a novel, comprehensive, and inclusive public sector supported effort to study and address climate risk issues. I am grateful to each of the members for their commitment to the effort, and their willingness to step up and tackle a difficult issue during an unprecedented time in our country's history.

The Subcommittee held two in person meetings beginning 10 months ago before the COVID-19 pandemic, and then held monthly, then weekly, and then almost daily telephonic meetings as they conducted their work. I received updates on their progress throughout the process. When I asked for a consensus document, I knew that was a high bar to achieve. However, I was very pleased, when in early September, the Subcommittee voted unanimously, 34-0, to approve the 165 page report.

In the months preceding the vote, there were many reasons to doubt the Subcommittee would meet its goal, specifically with the scope and charge of the Subcommittee. Many outsiders thought arriving at consensus with members from such diverse parts of the economy and market was simply not feasible. But, I was optimistic and determined given the seriousness of the issue and the need for action. More importantly, as a result of the dedication, skill, and creativity of each of our members, adept leadership and diplomacy by the Chairman, the cogent writing of the work stream leads, and the grit, determination, and wisdom exhibited by our

¹¹ *Climate Change*, BANK OF ENGLAND, <https://www.bankofengland.co.uk/climate-change> (last visited Sept. 29, 2020).

¹² See Patrick Bolton, Morgan Despres, Luis Awazu Pereira da Silva, Frédéric Samama, and Romain Svartzman, *The Green Swan: Central Banking and Financial Stability in the Age of Climate Change*, BANK FOR INTERNATIONAL SETTLEMENTS (Jan. 2020), <https://www.bis.org/publ/othp31.pdf>; *Origin and Purpose*, NETWORK FOR GREENING FIN. SYS., <https://www.ngfs.net/en/about-us/governance/origin-and-purpose> (last visited Sept. 29, 2020); THE TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES, <https://www.fsb-tcfd.org/> (last visited Sept. 29, 2020).

¹³ See Press Release Number 7963-19, CFTC Commissioner Behnam Announces the Establishment of the Market Risk Advisory Committee's Climate Related Market Risk Subcommittee and Seeks Nominations for Membership (July 10, 2019), <https://www.cftc.gov/PressRoom/PressReleases/7963-19>.

¹⁴ See Press Release Number 8079-19, CFTC, CFTC Commissioner Rostin Behnam Announces Members of the Market Risk Advisory Committee's New Climate-Related Market Risk Subcommittee (Nov. 14, 2019), <https://www.cftc.gov/PressRoom/PressReleases/8079-19>.

talented editorial team, the Subcommittee produced what I am very proud to present to you today.¹⁵

Before I turn to the report itself, I would like to take a moment to recognize and thank my Chief of Staff, Mr. David Gillers. David joined my office in July, 2019, and in many respects has shepherded this initiative from his very first day at the CFTC. David’s commitment and belief in the Subcommittee’s success has been steadfast, and his comprehensive understanding of the policy issues is a significant part of why we are here today. I’d also like to recognize and thank John Dunfee, Laura Gardy, and Alicia Lewis for their tireless work and support.

The Report

Managing Climate Risk in the U.S. Financial System (the “Report”) is a first-of-its kind document. This is the first time an advisory coalition representing a broad swath of the U.S. economy has come together under the leadership of the federal government, presented a consensus view diagnosing climate-related financial market risk, and outlined a roadmap to directly tackle the problem. Fortunately for us, the members were not bashful in what they have recommended.

A few of the critical findings of the Report:

1. Climate change poses a major risk to the stability of the U.S. financial system and to its ability to sustain the American economy.
2. U.S. financial regulators must recognize this, and should move urgently and decisively to measure, understand, and address this risk.
3. The financial system can be a catalyst for investment that accelerates economic resilience and the transition to a net-zero emissions economy.

The Report provides 53 policy recommendations, several of which I will highlight in a moment. But before I do, I’d like to establish a few threshold matters that the Report makes clear.

First, the Report establishes at the outset that it calls for policy and regulatory choices that are “flexible, open-ended, and adaptable to new information about climate change and its risks, based on close and iterative dialogue with the private sector.”¹⁶ In other words, there is much about climate risk that we are still learning, and policy makers must adapt to new information in real time. This is by no means an argument to delay action; indeed, the case for urgent and immediate action is clear. But, that action must be prudent and thoughtful, accompanied by continued evaluation and consultation.

Second, the Report recognizes that climate change already has placed disproportionate burdens on the low and moderate income households and historically marginalized communities. This is why the framing of every one of the recommendations, and indeed, the entire Report, considers impacts on low-to-moderate income households and marginalized communities. Any policy prescription must not exacerbate existing inequitable burdens of climate change. This is absolutely critical in ensuring the actions the government takes do not make the problem worse.

Finally, COVID-19 hit the Subcommittee as it did every other corner of our country, but there are lessons learned from the pandemic that are applicable to the climate discussion.

We should take note of the lessons learned from the Covid-19 pandemic: the importance of being decisive leaders, supporting and creating resilient stakeholders, of ensuring the availability of timely, consistent, and improved information, and of innovating to ensure our financial models build in risks and scenarios that are extreme but plausible in the near and longer term.

If we start building better equipped financial systems now that both acknowledge and account for the inevitable impacts of climate change, we can be positioned to avoid the need for extreme shifts in balance sheet management and fiscal and monetary policy.

Recommendations

The first recommendation of the Report is also the one that requires Congressional action: The U.S. should establish a price on carbon. The Report highlights that “[t]his is the single most important step to manage climate risk and drive appropriate allocation of capital.”¹⁷

As the Subcommittee’s chairman, Dr. Litterman has pointed out on several occasions, “financial markets do an amazing job of allocating capital in the direction of

¹⁵*Managing Climate Risk in the U.S. Financial System, Report to the CFTC’s Market Risk Advisory Committee by the Climate-Related Market Risk Subcommittee* (Sept. 2020), https://www.cftc.gov/About/AdvisoryCommittees/MarketRiskAdvisory/MRAC_Reports.html (the “Report”).

¹⁶*Id.* at ii.

¹⁷*Id.* at vi, 9, and 123.

the incentives that they are given.”¹⁸ And that is why, when incentives are appropriate, they can help lead to innovation, improvements in health and safety, and quality of life the world has never seen. But when the incentives are mis-aligned, as in the case of carbon emissions, there is a market failure, and the incentives go in the wrong direction, things begin to break down.

A negative externality is a cost imposed on someone outside of a specific transaction.¹⁹ Carbon emissions are a perfect example of a negative externality. Emissions impose significant costs on society in the form of current and future climate impacts, but the markets have not priced in this cost. In other words, the costs of burning fossil fuels and “other emitting activities have been treated until now as if they were ‘free.’”²⁰ When a negative externality is identified, “there is a role for the government to ensure those externalities are reflected in prices.”²¹ Without a cost in place, “financial markets lack the most efficient incentive mechanism to price climate risks.”²² Though a price on carbon is the single most consequential action policy makers could take to address climate risk, this recommendation serves as the context for the Report, rather than its focus.

In the absence of a price on carbon, there is still an urgent role for regulators. The Report points out that “financial regulators should actively promote, and in some cases require, better understanding, quantification, disclosure and management of climate-related risks by financial institutions . . . and other market participants.”²³ Regulators today have the authority to implement these requirements. The Report argues for critical action regarding disclosure, stress testing, scenario analysis, and governance.

Another key recommendation of the Report is international collaboration and harmonization. The U.S. is not alone in facing this challenge, nor are we alone in identifying policy solutions. When it comes to pricing carbon, disclosures, stress testing, and scenario analysis, it’s critical that we approach this together with our international partners. There are a host of international organizations active in this space. However, as the Report points out, the U.S. “is a reluctant participant in these efforts, and in some cases, it is absent.”²⁴ This seems illogical given the size of the U.S. capital markets, which are the largest in the world. Indeed, “[t]he largest futures exchange in the world is based in the United States Four of the five largest asset managers are based in the United States, and the United States represents the largest insurance market globally by premium volume. Without active leadership by U.S. regulators and financial institutions, the mission of prudent climate risk management will remain incomplete at best.”²⁵

Perhaps my favorite chapter is the last, which focuses on opportunities in financing the net-zero transition. Unlike many existing reports, the Report does not just focus on the downside risks. It makes the case that structural changes and market innovations can expand capital flows to sustainable finance solutions.²⁶ And in the process, create significant employment opportunities. By one estimate, the total worldwide investment needed in energy infrastructure to meet the Paris Agreement goal by 2050 (limiting warming to “well below” 2 degrees Celsius) is \$110 trillion. That’s roughly 2% of average global GDP per year. That could translate to enormous economic opportunities, according to the Report.

I’ll end my remarks with an observation from the Report that captures the seriousness and urgency at hand: “A world racked by frequent and devastating shocks from climate change cannot sustain the fundamental conditions supporting our financial system.”²⁷

The good news, though, is that we have virtually all of the tools we need to start our work. With the exception of a price on carbon, according to the Report, “existing legislation already provides U.S. financial regulators with wide-ranging and flexible authorities that could be used to start addressing financial climate-related risk

¹⁸ *Id.* at xix.

¹⁹ See *Externalities-The Economic Lowdown Video Series Episode 5*, FEDERAL RESERVE BANK OF ST. LOUIS, <https://www.stlouisfed.org/education/economic-lowdown-video-series/episode-5-externalities> (last visited Sept. 28, 2020).

²⁰ Report at 4.

²¹ *Id.* at xix.

²² *Id.* at 4.

²³ *Id.* at 120.

²⁴ *Id.* at 121.

²⁵ *Id.* at 8.

²⁶ Report at 103.

²⁷ *Id.* at 2.

now.”²⁸ As this Committee’s Majority Staff Report²⁹ has called for the Report to be provided to various congressional committees, I strongly believe all congressional committees with relevant oversight jurisdiction should consider the policy recommendations.

As one observer noted, we missed the subprime mortgage crisis which led to the Great Recession; we missed the COVID-19 crisis which has led to catastrophic loss of human life and economic shock; let us not miss the climate crisis.

Thank you for your time. I am happy to take any questions.

Ms. CASTOR. Thank you, Commissioner Behnam. And congratulations on your report. A 34-to-0 consensus report is an important signal to everyone, I think.

It is encouraging to see the CFTC issue the report and its call for urgent and thoughtful action to address ways that the climate crisis is already impacting important economic sectors and placing disproportionate burdens on frontline communities.

As you rightly note, the climate crisis poses threats that we cannot afford to ignore. You have testified that the single most important step to manage climate risk and drive appropriate allocation of capital is to establish a price on carbon. But in the absence of an explicit price on carbon, how are businesses responding to climate-related risk that may harm investors or destabilize markets?

Mr. BEHNAM. Thanks for the question, Congresswoman.

Certainly, businesses are recognizing this. And I think if you think about the effort and the subcommittee’s effort, it really is a demonstration that the private sector—academia, public interests—are doing a lot of work in this space. They recognize the risks, and they are taking steps towards managing and mitigating those risks.

From small businesses, midsize businesses, and large—you know, if you look at the diversity of the committee, we had large banks, asset managers, energy companies, agricultural companies, and a slew of other institutions in the financial services space and academia and public interests.

So there are private sector initiatives to come up with disclosure regimes, to come up with matrices, and new, sort of, methods of measuring risks and disclosures. There is a number of efforts going on overseas to help, sort of, think about policy in this space. So I am very encouraged by the work that has been going on in the private sector. I think it absolutely is a template.

And one clear message from the recommendations that really covers all of the recommendations, in a sense, is that we have to work together, it has to be collaborative, we have to work domestically and certainly internationally, but it is an iterative process. I noted that in my opening statement. We have to be flexible as policymakers, both elected officials and regulators, and we have to expect change.

Climate change is not predictable, it is not linear. A lot of things will happen that we cannot predict based on science and the data that we have today, so that, as we sort of enter this process and really start to transition to a net-zero economy, we have to be willing to be flexible, work with private sector participants, and adapt

²⁸ *Id.* at iii.

²⁹ SELECT COMM. ON THE CLIMATE CRISIS, 116TH CONG., REP. ON SOLVING THE CLIMATE CRISIS: THE CONGRESSIONAL ACTION PLAN FOR A CLEAN ENERGY ECONOMY AND A HEALTHY, RESILIENT, AND JUST AMERICA (MAJORITY STAFF REP. JUNE 2020), <https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf>.

on the fly. Because that is really going to be the only way to address these issues head-on and find solutions.

Ms. CASTOR. All right.

So let's talk about your favorite chapter of the report, the opportunities related to financing the net-zero transition. In your view, what are some of the economic growth and job opportunities Americans could expect to see if Congress implemented the recommendations in your report?

Mr. BEHNAM. Thanks.

You know, there are eight chapters in the report. It is fairly long. It gets into the weeds. But it is very comprehensive, and I think it is long past due. But most of the report, as you would imagine, focuses on risk and the steps that we need to take potentially to address the risk in the coming years.

But, to your point, chapter 8 is this great, sort of, end of the report that I think creates a lot of opportunities and really sends an opportunistic opportunity for market participants that, you know what? There are a lot of risks with climate change, but there are a lot of opportunities as well, and we need to seize those.

The amount of money flows going into renewable energy, I think there have been statistics—and they are cited in the report—\$110 trillion between now and 2050 will go to renewable energy development; \$4.5 trillion in the U.S. over the next decade or two to redo our electricity grid. These are obviously immense amounts of capital. The financial markets can play a huge role in allocating that capital to where it should go.

And, ultimately, it is just going to create jobs. BLS, the Bureau of Labor Statistics, I think says two to three new jobs are focused on wind and solar. As you pointed out, the wages have a premium to the average mean for salaries.

There are a lot of opportunities, as we think and emerge out of COVID, how are we going to rebuild the economy, how are we going to think about a 21st-century economy and build an infrastructure that is resilient to future climate challenges and really provide an economic spark for growth and prosperity for decades to come?

So I think there is a lot of excitement in this space, and folks should be very interested in the opportunities, I think, for both employment and productivity across the board.

Ms. CASTOR. And do you agree that those opportunities are international, that the clean energy transition will be a global one? How do you think America can best position itself to benefit and lead the transition?

Mr. BEHNAM. You know, when I think about that issue, the international alignment issue—because it is critically important. This is an international issue. It is not a U.S. issue, it is not a geographic issue. It is certainly a global issue—I think about this in the context of U.S. markets, capital markets, derivatives markets being the most desirable in the world. I think about Silicon Valley being the envy of the technology world. I think about academia. U.S. academics and our institutions of higher learning are the envy of the world.

As we have, you know, endured for many years to be energy independent, I think we have to think about the future, the next

few decades. We have to think about energy independence, and the opportunities are now to provide the U.S. with the independence that we will need for the decades to come.

And, obviously, that affects our environment, that affects human health. Ranking Member Graves mentioned this for sure, but we need to think about national security, as well, and what are we going to do and how are we going to position ourselves in the decades to come?

And I think this is the opportunity. As we see these amazing capital flows going to renewable energy, we have to seize on our capital markets, we have to seize on our academics, we have to seize on our industrial base and our middle class, and really start to innovate so that we can be the centerpiece of the renewable-energy transition for years to come.

Ms. CASTOR. Outstanding. Thank you.

Ranking Member Graves, you are recognized for 5 minutes.

Mr. GRAVES. Thank you, Madam Chair.

Commissioner, again, welcome, and appreciate you being here today.

What role do you see U.S. competitiveness playing in this larger issue? You have mentioned this being an international issue a number of times today already. What role do you see that playing?

Mr. BEHNAM. Congressman, I totally appreciate your point about, really, the competitive element of the transition and what we can do. I think and I am a firm believer that we have to take a leading role in this.

Naturally, if we take steps toward transitioning to a net-zero economy, we could potentially put ourselves at a competitive disadvantage in the short term. But climate change is a long-term issue. It is one that we have to think about over the next 10, 20, 50, 100 years and more. And I think, you know, historically, the U.S. has had a leading role in any number of policy issues, and I really think this is an opportunity for us to really elevate the rest of the world in demonstrating our leadership both on the production side and the consumer side so that others will follow.

And, you know, it is not going to be a smooth ride. Again, in your opening statement, I couldn't agree more, there are going to be roadblocks and barriers. But a lot of the report focuses on flexibility and understanding that we are going to have to adapt over the course of the next few years and decades to address the climate risks.

Mr. GRAVES. And you did talk about flexibility, you talked about working within the international community. I totally agree.

When you talk about flexibility, do you think it is appropriate for us to choose the energy technology winners and losers? Or do you think it is better for us to allow the market to effectively innovate, as they do, and, kind of, innovate us into the solutions that are needed, as in the past the United States has done, by reducing emissions more than any other country?

Mr. BEHNAM. I certainly support what you say, that we need—I would err on the side of not picking winners and losers.

I think if you think about the first recommendation and the carbon price, if there is a carbon price, capital will be allocated to different industries, and I don't think it is going to be industry-spe-

cific or product-specific; it is just going to be focused on renewables and, sort of, supporting the innovation in that space.

Mr. GRAVES. Well, but why do you say renewables only, when we have proven that we can actually complement conventional fuels with carbon capture, storage, and utilization technology and end up with net-zero emissions or even maybe net reduction in emissions through some new emerging technologies? So isn't it—

Mr. BEHNAM. Congressman—

Mr. GRAVES [continuing]. Emissions we are targeting, right?

Mr. BEHNAM. Yeah, absolutely. And from a carbon capture standpoint, I can't speak specifically to the technology and where it is, sort of, in the arc of its growth and development. But I think, at this point, when you think about the core energy sources that could sort of help us transition in the short term, a lot of the renewable sources, whether it is wind or solar, are going to be there, but carbon capture, I know, is developing—you know, I don't know about quickly, but it is developing and certainly is going to play a key role in our net-zero transition.

Mr. GRAVES. And you mentioned earlier that the U.S. should play a leadership role. You talked about that would cause volatility. What degree of volatility do you think is acceptable?

Mr. BEHNAM. I can't put a number on it specifically, but I will say this: In terms of—and this kind of goes to the issue of transition risk, which the report talks about.

As we move forward, there is going to be transition risk. I think we need to continue moving forward regardless of, sort of, the bumps along the road. Because the longer we take to transition to a net-zero, the shock that we may face down the road because of a climate disaster or a growing climate event will be greater. So—

Mr. GRAVES. But it also—

Mr. BEHNAM [continuing]. As we transition—

Mr. GRAVES. We would also have greater volatility or an exacerbated volatility by moving unilaterally, which is why you have said numerous times that a carbon price or other types of solutions must be done in a multilateral or an international format. Did I understand that correctly?

Mr. BEHNAM. That is correct. But I think, by not moving, we are only creating essentially a feedback loop on the climate issue that will just grow if we don't transition.

Mr. GRAVES. I am not going to argue with you at all on that, but do you—

Mr. BEHNAM. Yeah.

Mr. GRAVES [continuing]. Just “yes” or “no,” because my time is running—

Mr. BEHNAM. Yeah, yeah.

Mr. GRAVES [continuing]. Just “yes” or “no,” and I don't mean to box you on this one, but—

Mr. BEHNAM. Sure.

Mr. GRAVES [continuing]. Don't you agree that, with the momentum we have already built up through greenhouse gas concentrations, resiliency investments are some of the best things we can do to help provide certainty and put brackets on the uncertainty, right?

Mr. BEHNAM. Yes.

Mr. GRAVES. Because we can't do anything about the momentum that is already in the environment.

Mr. BEHNAM. Yeah.

Mr. GRAVES. Yeah.

And then, lastly, Madam Chair, I just want to read in the—in the Senate Democrat report, they say that it is a global issue and unilateral action could harm the United States, agreeing with the Commissioner's comments.

They say that increased overall production—it would increase overall production costs, that, left unchecked, the policies would threaten U.S. competitiveness. It said, “quote, we could see U.S. companies shift their production overseas.” And they further acknowledge, quote, “it will not only lead to an increase in total global emissions but also outsources the American jobs.”

So the Commissioner's comments about this international approach, not moving unilaterally, I think is really key here.

Last thing, Madam Chair, I just want to clarify that—it was mentioned that this is a CFTC report, and I don't believe it was actually a CFTC report. I think it was the subcommittee—or your report that the subcommittee then approved.

Mr. BEHNAM. That is correct.

Mr. GRAVES. Yeah.

Thank you. Yield back.

Mr. BEHNAM. Thank you.

Ms. CASTOR. Yeah, I think we understand it is going to take an international approach. And I wish we would have had more GOP Members join us in our Climate Action Now bill that just said simply that the U.S. needs to remain in the international climate agreement.

So, at this point, I will recognize Congresswoman Bonamici for 5 minutes.

Ms. BONAMICI. Thank you, Chair Castor and Ranking Member Graves and to our witnesses.

I represent a district in Oregon. Nearly a million acres have burned across my home state in the last month as a result of historic winds and dry fuel conditions. Air quality has surpassed hazardous levels and at times has been comparable to the most polluted places in the world, further endangering the health and livelihoods of those already at risk of respiratory issues from the coronavirus pandemic.

Many Oregonians have been placed under evacuation orders, and hundreds have lost their homes. And if this immediate crisis were not enough, many experts are predicting significant flooding and landslides this winter as precipitation increases and soil remains unstable.

So, Commissioner, I thank you for your testimony.

In your testimony, you have noted that the CFTC is focused on extreme but plausible scenarios. So how can the compounding crises of the coronavirus pandemic, raging wildfires in the West, and extreme weather events in the Gulf over the last month inform our understanding of financial market risks in the future?

And can you please explain how these examples further demonstrate that the cost of inaction may be higher than the cost of transitioning to a 100-percent clean energy economy?

Mr. BEHNAM. Thanks, Congresswoman.

One thing I would point out—there can be a lot of answers to that question. It is a great question. There is a term used in the report called “subsystemic shocks.” We obviously dealt with systemic shock in the 2008 financial crisis. But, to your point, you have a series of regional weather events that happen at any one time. We are not accustomed to them happening together or, sort of, compounded. But these are the extreme events that are plausible, and we are seeing that on a day-to-day basis, and that we need to plan for. Obviously, an unlikely scenario, but something that we should plan for.

And the unfortunate reality, as you pointed out, with our wildfires out West and then the flooding because of the hurricanes in the Gulf Coast, you can start to see the pattern of what might happen if you then compound a series of flooding over the spring/summer season that would affect the agricultural productivity or Gulf Coast hurricanes going up the East Coast.

With these subsystemic risks, you are going to have local issues and local challenges for regional economies, regional growth and productivity, regional financial institutions in terms of credit and lending. And, again, if you have that extreme scenario where a couple of these events happen at the same time, that subsystemic risk could certainly rise to a systemic shock nationally. We learned very clearly in 2008 the interconnectedness of the financial markets, and we have to be aware of that.

In terms of transition risk, I would say, yes, we are going to face bumps along the road, as I pointed out with Ranking Member Graves. It is going to be difficult, but that goes to the point of being flexible and iterative as we go forward. But I still think we have to move forward.

If we don't move forward and just use these challenges and these bumps as reasons to stop, we are only, sort of, creating a feedback loop of creating more climate risk because of carbon emission.

Ms. BONAMICI. Right. Right. And the cost of inaction is pretty clear.

So our committee's climate action plan calls for a Climate Risk Information Service to develop localized climate risk information that will include projections of floods, wildfires, and other natural disasters. And this approach is designed to better inform the development of resilience codes, specifications, and standards for local communities. And I am working now to turn this recommendation into a standalone bill.

In chapter 5 of the report, the CFTC subcommittee recommends that financial regulators and the private sector should support the availability of consistent, comparable, and reliable climate risk data and analysis.

So what climate risk data is the most important for integration into financial models? And are there any gaps that Congress should be aware of?

Mr. BEHNAM. Congresswoman, it is a great question. In my view, the heart of solving this problem, among many other strategies, is data and disclosures.

There have been a lot of efforts in the private sector, as I pointed out, in terms of identifying data. A lot of this is yet to be determined. I think there are a lot of academics that are working on this, private market participants that are using climate science to identify what type of data would identify risk to the financial system that could be then, sort of, caught before issues happen.

I would recommend, sort of, working with some of the private institutions that have started thinking about this. Under the Financial Stability Board, the Task Force on Climate-Related Financial Disclosures has done a lot of work in this space.

Any effort to get the data and disclosure that is needed is going to, again, have to be collaborative. It is going to have to be a public-private partnership. But data is critical. And having a data source that is shared among public and private participants is going to be critical to addressing these issues.

Ms. BONAMICI. Terrific. Thank you very much.

I am going to yield back the balance of my time. Thank you, Madam Chair.

Ms. CASTOR. Thank you.

Representative Palmer, you are recognized for 5 minutes.

Mr. PALMER. Thank you, Madam Chairman.

I just want to ask the witness, if the U.S. achieves net-zero, what is the net effect that it will have on climate change?

Mr. BEHNAM. Sir, thanks for the question.

I can't answer that with complete certainty. I am not a scientist. But, you know, from my basic understanding, as we shift towards net-zero—you know, as we think about carbon emissions and greenhouse gas emissions, there is, you know, heat capture in the atmosphere, which is causing rising air temperatures, rising sea levels, and is, you know, connected to the weather events that we are seeing, these more extreme, more frequent weather events.

Mr. PALMER. Well—

Mr. BEHNAM. So, based on my understanding and what the science would say, if we can achieve net-zero, then we can start to think about reducing carbon in the atmosphere and hopefully stabilizing the atmosphere.

Mr. PALMER. Well, the answer that we have gotten in this committee in previous hearings is that, if the U.S. went to absolute-zero—not net-zero, absolute-zero—it wouldn't have any impact on climate change.

And I understand the climate is changing. I think that CO₂ emissions have a warming effect. But the bigger problem is the climate change we can't do anything about that is occurring through natural variations.

So, considering that the scientists say that if the United States went to absolute-zero that it would have no impact on climate change, does it make sense to put the country through the economic devastation that these policies would create instead of investing more in adaptation and resilience, as my colleague Congressman Graves has pointed out?

Mr. BEHNAM. Sir, I would point out that, specifically with respect to the CFTC report, it really focuses on what you said, that, regardless of what you think has caused the change in climate, I think there is, you know, fairly broad acceptance that the climate is changing and that we need to adapt to that.

From a financial markets perspective, that means building in new scenarios, that means building up new information data sets that we disclose to regulators and investors, that means, you know, adapting our best practices in governance so that we can adapt to a changing climate.

Mr. PALMER. Well—

Mr. BEHNAM. Again, I can't answer the scientific questions of the climate change and how a net-zero economy will affect it, but I am speaking from a financial regulator standpoint that—

Mr. PALMER. Reclaiming my time—

Mr. BEHNAM [continuing]. There is a—

Mr. PALMER. Reclaiming my time, the point is that most of what is being proposed in the Green New Deal and these other policies, it is all about eliminating CO₂ emissions, when we know that doesn't really affect climate change, especially if the rest of the world is not doing it. And even if the entire world went to net-zero or to absolute-zero, it would only mitigate the impact.

So it is kind of like recommending extensive chemo for someone who doesn't have cancer or has another disease. It might have, you know, a mild impact, but the remedy would be worse than the disease. And that is the problem that I have with some of these policies.

And, you know, I have looked at what is going on in other places around the world and how they have adapted and built in resiliency for everything from sea level rise to floods to wildfires. And despite what my colleagues from the Western States on the other side of the aisle think about forest management, forest management is the best solution to controlling wildfires. And that is part of the resiliency that you build into your forests in anticipation of extreme weather events.

So the stuff that I have looked at indicates that we are far better off to do adaptation, build in resiliency, but do it in a holistic manner that takes into account the climate change that we can't do anything about that occurs from solar variations and other natural phenomena that, frankly, we can't deal with.

I think there are a lot of people, a lot of companies that like the old idea of the cap-and-trade and the carbon tax because they are going to make a boatload of money out of it, but it really doesn't do anything to solve the problem of climate change.

And my last question to you, sir, in the few seconds that I have left is: Do you support the Green New Deal? Apparently—

Mr. BEHNAM. Sir, I am not—

Mr. PALMER. Apparently, the Democratic nominee, Biden, doesn't support it anymore. I just wonder if you do.

Mr. BEHNAM. Sir, I am not going to—I have not examined the Green New Deal front to back. I am a financial regulator. I certainly think about climate change issues, but not in the weeds enough on the Green New Deal to take a position.

Mr. PALMER. Well, I thank the gentleman for his honesty, and I do thank you for your work.

And I yield back.

Mr. BEHNAM. Thank you.

Mr. LEVIN. Chair Castor? I am sorry, I didn't hear you.

Ms. CASTOR. Yes. Congressman Levin, you are recognized for 5 minutes.

Mr. LEVIN. All right. Thank you very much. I appreciate that.

And thank you for having this hearing today. Extremely important topic. Because, obviously, climate change isn't only a threat to the health of our communities but also to our economic prosperity.

And it is important that those risks are explained and quantified, which is why I am very grateful to work with my friend, Representative Casten, on the Climate Risk Disclosure Act, which he has just done a great job leading. His bill would require public companies to disclose how they will be impacted by the climate crisis and create an environment of transparency for investors. And I am really grateful for Representative Casten's leadership in this space on the Financial Services Committee.

Commissioner Behnam, I was pleased to see the CFTC climate subcommittee report recommended that U.S. regulators should join as full members international groups focused on exchanging information on monitoring and management of climate-related financial risks, including the Network for Greening the Financial System.

As you know, the Network for Greening the Financial System, or NGFS, is an international organization of central banks committed to meeting the goals set forward in the Paris agreement. There are currently 72 active members of the NGFS, including the central banks of Canada, China, Germany, and most European countries.

However, despite our international partners' membership, the U.S. still has not joined the NGFS. In May, Representative Casten and I led a letter to Fed Chairman Powell urging him to join the NGFS as an active member.

So, Commissioner Behnam, do you believe the U.S. should join international climate finance organizations, like the Network for Greening the Financial System, as recommended in the subcommittee's report? If so, why is it important for the United States to participate?

Mr. BEHNAM. Thanks, Congressman.

Yeah, as you point out, this is one of the recommendations in the report. And as I mentioned earlier, both in my statement and in response to the chair's question, international alignment is key on any climate change issue, whether it is dealing with the environmental impacts or, of course, in the context of this conversation, the financial resiliency impacts.

So I agree with the recommendation. I think it is important that we work with our partners, and, as you said, that is a growing coalition of central banks and other regulators and policymakers. And I think it would be helpful to be a part of that dialogue so that we can address these issues in a more holistic manner.

Mr. LEVIN. Thank you for that.

I was also happy to see the CFTC report acknowledged that the Financial Stability Oversight Council, which is charged with monitoring and identifying emerging threats to our financial stability,

should, and I quote, “incorporate climate-related financial risks into its existing oversight function, including its annual reports and other reporting to Congress,” end quote.

In August, Senator Schatz and I led a bicameral letter urging Treasury Secretary Mnuchin, as Chair of the Financial Stability Oversight Council, or FSOC, to consider climate risk when responding to emerging risks to the stability of our financial system. I was disappointed, we got a one paragraph response from the Treasury Secretary stating that, quote, “at this time, this is not a systemic risk that warrants FSOC review,” end quote.

So, Commissioner, what role do you think the Financial Stability Oversight Council should play in monitoring and identifying climate-related financial risks?

Mr. BEHNAM. Thanks again, Congressman.

You know, the FSOC was created in Dodd-Frank, and it was really, in my view, a response to the financial crisis and how we were not really looking at the financial system as holistically as we needed to. Obviously, we have a patchwork of financial regulators that deal with very different, discrete issues, whether it’s a market regulator, like the CFTC, or a prudential supervisor, like the Fed. And FSOC serves as this really great central point of contact within Treasury, using all of the leads of the financial regulators to examine issues. So I do think it would be a very good issue to examine.

Climate change is probably not something—again, as I said, that people think of financial markets when they first think about climate change. I also think, you know, you can use as an example, before the COVID pandemic, in the February–March period, you know, if you asked a few people a couple years ago, would you have thought that this would cause, you know, market instability and the issues that we experienced in March—that a health pandemic would cause the instability and the issues we saw in the March–April period, you know, a lot of people would probably say no. You don’t draw those connections. But the COVID pandemic was a clear, I think, example of how any crisis in the economy or in the country is going to have a direct effect on the financial markets. We have the economy, obviously, as a proxy.

So a climate crisis and the impending climate issues we are going to deal with in the next couple decades, I think, demands at least a starting discussion. And FSOC, I think, is a good place to start that discussion.

Mr. LEVIN. Thank you, Commissioner.

I am out of time, but I thank the chair again for having this important hearing today.

Ms. CASTOR. Representative Miller, you are recognized for 5 minutes.

Mrs. MILLER. Thank you, Chair Castor and Ranking Member Graves.

And thank you to Commissioner Behnam for being here today. Can you hear me?

Mr. BEHNAM. Yes, ma’am.

Mrs. MILLER. Okay. Thank you.

Commissioner Behnam, your report notes that a small group of states have a carbon price.

According to the most recent EIA data on carbon emissions, since 2010 those states have underperformed the rest of the country in reducing emissions. In addition, those states have electricity and energy prices significantly higher than the rest of the country. Furthermore, those states are now major importers of energy from other states.

My state of West Virginia reduced emissions by nearly 10 percent from 2010 to 2017, nearly 20 percent since 2005, while California's emission levels were unchanged from 2010 to 2017 and only a paltry 5 percent below in 2005. At the same time, retail electricity prices in California are 78 percent higher than West Virginia's. I can't remember a time in West Virginia when we suffered from rolling blackouts because of energy starvation.

If we have reduced emissions more and have cheaper energy and we don't have any blackouts, what is the argument for my state to become more like California?

Mr. BEHNAM. Congresswoman, thanks for the question. Again, you know, I would just reiterate that the report is focused on, sort of, financial resiliency and not necessarily specifically the transition.

But, you know, my response to your point—and, you know, there is the RGGI in the Northeast, and I know California has its own system. You know, these are—this goes to the point about this being an iterative process that has to be flexible along the way. It is not going to be perfect. It is going to have to build and probably be rebuilt and, sort of, evolve over time. And, you know, I would suggest that, to your points, which are very valid points, that people will have to adapt, systems will have to adapt, as we move forward to a net-zero economy.

Mrs. MILLER. Well, I hope we have a lot of flexibility, because I don't want to adapt to be like California.

And, furthermore, I noticed that you mentioned in your testimony that your report recognizes that climate change already has placed disproportionate burdens on the low- and moderate-income households and historically marginalized communities.

In order to combat climate change in West Virginia, we had a misguided renewable standard that forced our low-income individuals to choose between paying for their groceries or keeping their lights on.

In fact, in California, civil rights leaders sued the state because the State of California's climate policies had a negative and a regressive impact on the poor and people of color.

Commissioner, how would you respond that moving away from affordable baseload energy and, instead, moving towards expensive renewables actually harms low-income individuals and people of color?

Mr. BEHNAM. Congresswoman, again, I am going to focus on the resiliency standpoint. I think it is important, as a broader matter, that we transition.

Obviously, as you pointed out, the report suggests and there is evidence that climate change disproportionately affects low- to moderate-income communities and rural communities. As we think about policy—and I know the report outlines this specifically—it

recommends research and it recommends thinking to, sort of, address these unintended consequences.

I can't, again, speak to the specifics of West Virginia and what has happened there. But, again, to my earlier response to your first question, we have to adapt and we have to work towards the transition so that we don't have unintended consequences and burden. But, ultimately, I think it is important that we move forward. Because if we don't move forward, we are going to continue to, sort of, endure these more extreme, frequent weather events.

Mrs. MILLER. Well, I think unintended consequences are so—we need to be so careful with how we legislate. I know, with my older retirees, when their electric bills tripled, they really, really struggled.

I yield back my time.

Ms. CASTOR. Rep. Casten, you are recognized for 5 minutes.

Mr. CASTEN. Thank you, Chair Castor.

And thanks so much for being here, Commissioner Behnam.

I am excited, and notwithstanding some of the doom-saying from my colleagues across the aisle, we all know that replacing old, amortized, high marginal cost generation sources with new, zero marginal cost generation sources makes us all wealthier. Thank you.

We also know that for 30 years we have made consistent arguments that we shouldn't act until others do. Over those 30 years, we have elected some 15 Congresses, and every single person who ever ran for office claimed that they were capable of leadership and then sits here in these chairs and says, "God forbid we lead." Commissioner Behnam, thank you for leading.

In your report, you recommend that public companies disclose their exposure to physical and transitional risks. Now, I think it is obvious how that benefits investors in those companies who might bear those losses. Can you explain a bit about how those disclosures might help the companies themselves?

Mr. BEHNAM. Thanks, Congressman.

Ultimately, you know, disclosures are a key part of this. I mentioned this earlier. Information—better information—allows regulators and investors to make more informed decisions.

I think as the community of public companies starts to think about what climate risks are, I think it is just going to allow them to adapt to, again, a changing climate in the future and create more efficiencies for the company from both an employment standpoint and a productivity standpoint.

The challenge is coming up with the common data sets, the metrics to measure risk by. One of the biggest challenges in the disclosure space is, sort of, what constitutes material risk. Material risk is a standard term for public companies under the SEC's 1934 act, but climate change is very different than, sort of, traditional material risk, I think, in my view, from what it is normally—from what the Commission and public companies expect.

So we have to rethink that issue so that companies can assess climate risk better in the short, medium, and long term.

Mr. CASTEN. Yeah. I am glad you raised that. You know, I think there is the separate section about disclosing emissions, which obviously is a separate issue, and that is easy. I have sort of compared the challenge that you described to being why we created

generally accepted accounting standards, right? We need a standard way to disclose financial liabilities in the same way we need a standard way to describe environmental liabilities.

On the disclosure of emissions, can you discuss—and just briefly, because I do want to get to a couple last questions—how that benefits investors in companies, knowing how much a given company emits?

Mr. BEHNAM. From an investor standpoint, the more information, the better, right? It is making the most informed decision. And whether it is scope 1, scope 2, or scope 3 emissions, I think, for an investor, in institutional or retail or a pension, having an understanding of what type of emissions exist is certainly potentially going to affect the bottom line.

And that could come from a transition standpoint—transition risks being anything influenced by policy, consumer preference, or technology changes. And then, ultimately, you know, as we are seeing now, if emissions are a big part of a company's, sort of, production, then it could potentially, you know, lead to a stranded asset, which is a term that is often used within the context of transition risk.

And these are the types of decisions and information that I think are super valuable to investors to make more informed decisions.

Mr. CASTEN. I feel like I want to go out for a beer with you at some point. And, by the way, I love the book "Titan." I am looking at it on your back shelf.

Well, here is to transparency of risks and ensuring that markets can better allocate capital. As Mr. Levin pointed out, I have introduced H.R. 3623, the Climate Risk Disclosure Act, which would direct the SEC to require companies to disclose these physical, these transitional risks, these emissions risks.

From your vantage point, do you believe the SEC has the authority to fulfill those obligations in the absence of legislative action?

Mr. BEHNAM. Sir, from my understanding and from the report, I believe the authority is there to make those changes.

Mr. CASTEN. Do you believe they have the obligation?

Mr. BEHNAM. Under current rules, I think, given—in my view, given the material element and material risk of climate change, yes.

And this is to my point earlier. Climate risk should be mandatory, and it should be clear, and it should be understandable. And, you know, the existing system and the existing disclosure system, although good and effective—for what we have done and built over a number of decades in terms of public company disclosures, it is fine, but, as we deal with climate risk, which is more forward-thinking, is nonlinear and creates a new and really unknown set of risks, I think to rely on the older existing system is really not going to be able to give both regulators and investors the information they need.

Ultimately, you know, if you don't have clear, sort of, guidelines, I think, from an issuer standpoint to know what needs to be disclosed from a climate risk perspective, it is going to become very subjective of what constitutes climate risk, what constitutes material. And that is, I think, where there needs to be a little bit more clarity and certainty from the SEC so that issuers can pinpoint ex-

actly what climate risk is and what needs to be disclosed in these documents.

Mr. CASTEN. Well, that is fascinating. I am out of time, but I really do, from the bottom of my heart, thank you for your leadership.

And I yield back.

Ms. CASTOR. Great.

Rep. Huffman, you are recognized for 5 minutes.

Mr. HUFFMAN. Well, thank you, Madam Chair.

And, one of these days, I would love to get some of our colleagues out to California. We hear a lot of this California bashing, but it would be great to help them better understand the difference between the unit cost of energy and people's electrical bills and other things, help them understand that the direction that California is going, toward a clean energy future, is not somehow empowering of the Russians or the Saudis. It is actually quite threatening to the energy influence of those regimes.

But it is also quite threatening to the profits of the fossil fuel industry. And that is what this really is all about.

In any event, if a desire to understand California's leadership on these issues is there, we would love to have them out to visit and to better understand these things.

Commissioner Behnam, thanks for your testimony.

I am speaking to you from California, where we are experiencing the "airpocalypse" that you describe—dangerously high particulate pollution due to wildfires that are brought to us by this addiction to fossil fuel and the extreme weather that climate change is going to bring more of, not just to California but other places around the West.

This is an historic year, to be sure. We have more homes burning, we have more communities devastated, and more lives tragically lost. And the communities I represent see this climate risk firsthand, but the world of financial markets too often just sees these as dollars and cents on a spreadsheet, these risks.

So I really do want to thank you for working to bring attention to the real-world consequences of climate risk.

And your recommendations note the importance of driving an appropriate allocation of capital, as financial markets, obviously, can do amazing things when they respond to incentives that are properly given, but we have to get those incentives right.

When the incentives are wrong, we know we get disastrous results. And that happens when we let climate polluters externalize the costs of their pollution, when we don't factor in the impacts and costs of climate change, including to public health. We are going to get more extreme weather events—droughts, heat waves, wildfires, hurricanes—and we need to factor in what that really means for people and communities all over this country.

So you mentioned that, without active leadership by the United States, including its regulators, private capital really can't be fully unleashed to bring us this fast transition to clean energy, to a net-zero future that we need.

I want to ask you about what happens when we not only fail to send those regulatory and policy signals but when we do the opposite—when we withdraw from the Paris Agreement, when our

President rejects and trivializes climate change and claims science doesn't know.

When this happens, do we see private capital go the wrong way? Do we see it continue to flow into dead end fossil fuel projects and technologies that actually makes these climate impacts worse?

Mr. BEHNAM. Thanks, Congressman, for the question. I would say, and this is a result of sort of my experience with the subcommittee that I formed and the report they came up with, it is pretty remarkable what the private sector has been doing. And I think there is a recognition from the private sector that climate risk is real and that they want to protect their institution and their bottom line for the future and that addressing climate risk is important. I think also there is a natural sort of bottom-up flow from consumers and clients that are really forcing the institutions to start thinking about climate risk and building in some of these ESG factors which I am sure you are familiar with.

So, on the one hand, I am very sort of comfortable, and it is confirming a lot of what I thought, that the private sector is working toward, but this is a public-private sort of challenge. It is the problem of the commons, and we have to work together. And it really becomes important, I think, for the public sector to push so that we can understand things better, assess risks better, and have a level playing field for domestic and international partnerships.

Mr. HUFFMAN. All right. Thank you.

Commissioner, could you talk a little more about the importance of disclosure so that private capital can actually understand and act upon the areas of greatest climate risk?

Mr. BEHNAM. Sure. Like I pointed out, disclosure is information to me. As I kind of break it down, it could be anything from disclosure to regulators or disclosure to investors and pensions. Having as much information, and this goes without saying, with any decision we make in life, when we are more informed, we are going to make better decisions, better for us, better for our families, better for our communities.

So disclosures are key, but the information underlying the disclosures is also. It cannot be subjective. It has to be objective, it has to be fair, it has to be counted, and it has to be understandable, and it needs to assess the risk appropriately. And this really goes to the point of how we need to work both, you know, internationally and domestically to come up with a system, you know, working with the private sector, and a set of benchmarks that will collect the data that is necessary and will, you know, provide us the information we need to make the most informed decision.

Mr. HUFFMAN. All right. Thank you, Mr. Commissioner.

Thank you, Madam Chair, I yield back.

Ms. CASTOR. Thank you.

Congresswoman Brownley, you are recognized for 5 minutes.

Ms. BROWNLEY. Thank you, Ms. Castor.

And thank you, Commissioner, really, for your leadership in this area. I loved the end of your testimony when you said we have missed subprime mortgage crisis, we have missed the COVID-19 crisis, and we can't afford to miss the climate crisis. And I think most of us here are clearly aware of the urgency of climate.

So my question is, if—you know, if Congress, let's just say hypothetically that Congress did its part and, you know, invested significant Federal dollars into a clean economy in the ways we sort of laid out in our report, but the financial regulators don't do their part, don't implement their recommendations, you know, what is the net effect of that? How does it slow us down?

Mr. BEHNAM. Thanks, Congresswoman. Yeah, this really goes to a key point in the report in that financial markets are extremely powerful. And if the incentives are correct, financial markets are going to be this amazing tool to allocate capital in the right place where the incentives push them. So if the incentives are in the right place and they are in line with some of the transitioned goals that the committee—your committee—advocates, and financial markets will certainly support and, I think, move that transition much quicker and much more efficiently so that we don't face the transition risks, which I spoke about a little bit earlier.

Ms. BROWNLEY. So I wanted to go back to carbon pricing for a minute. You know, you are stating very clearly that investors and regulators now have come a long way in terms of understanding the importance of climate risks and, you know, financial stability. And, you know, you say in your report carbon pricing is really, you know, the most important part of that whole equation, and that is something that Congress has to do, that the markets really can't do it.

So I guess my question is, you know, when is it going to be when the financial markets and the industries are knocking on all of our doors here in Congress, saying in one voice that we need to move forward on this, we need to have an actual carbon price? When is that going to happen?

Mr. BEHNAM. Well, you know, there are a number of groups that include companies from all industries that are—that already support a carbon price. So I would say we are not too far off. You know, even if you look at my subcommittee, I mentioned this earlier, you have a range of institutions, from banks and institutional investors to energy companies and agricultural companies, and a carbon price was the first—and the chair of the subcommittee said this—but the carbon prices were the first thing they agreed on, and it wasn't really in question or debated.

And it really comes to the point of allocating risks. Carbon is a negative externality right now. There is no cost to it. It affects the atmosphere, and no one owns the atmosphere. So unless there is a price on carbon, there is really no risk to it. And if there is no risk to it, then the markets won't react around that risk and that cost.

So if we are going to move the transition to net-zero smoothly without too many bumps along the road, then I think having a price on carbon is going to incentivize that move very clearly, eliminate the transition risk as much as possible, and get it to where we need to be to protect our environment, our economy, and our national security.

Ms. BROWNLEY. So last question is, there still seems to be, I think, a misperception among investors that, you know, investing—investing in climate and gaining good returns on that investment, that, you know, that they believe that that is—we are still not

there yet, in terms of getting the kind of return that they want on their investment.

So how do we—you know, how do we change that misperception that is out there? It sounds to me, based on everything you are saying, that it is changing. And the people who are—you know, many have already changed their mind and moving in that direction. And I think the more investors there are advising clients, more people in the financial markets advising their clients and so forth in terms of investing that kind of capital. But what can we do to sort of change that perception?

Mr. BEHNAM. You know, institutional money is going there. Preferences are changing. You are seeing the growth in this ESG space, environmental, social, governance, investing pocket, grow really exponentially. And, if nothing else, that is the proof that there is demand for these products, there is an understanding that these products have long-term value, and that in the end, the return on your investment will be positive, and if not greater than, a traditional sort of asset.

I think from a regulator or an elected official standpoint, it really goes back to just more clarity of understanding what constitutes ES&G, and any other thing in the sustainable finance space. These are all very different things. We have different sets of metrics, as I pointed out earlier. There is the domestic versus the international standard. Coordination along this line is just key so that investors know exactly what they are investing in, and especially down to the retail level as well, whether it is a retail investor on their, you know, computer investing in assets, or an institutional investor or a pension investor. You need to know what you are investing in, you need to know what the comps are, and you need to have a firm understanding of what constitutes sort of environmental or sustainable investing. So I think there is a role for policymakers in the public sector in that respect.

Ms. BROWNLEY. Thank you very much, and I yield back my time.

Ms. CASTOR. Thank you.

Well, thank you, Commissioner Behnam, for your outstanding testimony today. We really do appreciate all the hard work you put in for your Market Risk Advisory Committee report. And Rep. Casten will be in touch shortly for your socially distanced beer or Zoom beverage. But thanks again for being here today.

Now, we will move to our second panel. We will give our witnesses a moment to turn on their cameras.

Ms. CASTOR. Here we go. Great. Welcome to our second panel. I will go ahead and introduce everyone, and then we will hear from each of them for 5 minutes.

Dr. Joanna Syroka is Senior Underwriter and Director of New Markets for Fermat Capital Management, an investment advisory firm. Prior to joining the firm, she was director of research and development at African Risk Capacity, Africa's first sovereign insurance school, where she led the development of their parametric drought, flood, pandemic, and climate insurance initiatives. Dr. Syroka also developed a weather risk management solutions with the World Bank and in the humanitarian arena with the United Nations World Food Program.

Rich Powell is the Executive Director of ClearPath, whose mission is to develop an advanced conservative policy that accelerates clean energy innovation. Rich served as the member of the 2019 Advisory Committee to the Export-Import Bank of the United States. He is also on the Atlantic Council's Global Energy Center's Advisory Group.

Maggie Monast is the Director of Working Lands at the Environmental Defense Fund. She works with farmers, food companies, agricultural organizations and others, to create an agricultural system that drives climate stability, clean water, and food security. Ms. Monast works to quantify the farm financial impacts of conservation practice adoption, collaborates with major corporations to develop sustainability initiatives, and develops innovative financial incentives to advance sustainable agriculture.

Welcome to all of you.

With that, Dr. Syroka, you are recognized for 5 minutes to give a summary of your testimony.

STATEMENTS OF DR. JOANNA SYROKA, SENIOR UNDERWRITER & DIRECTOR OF NEW MARKETS, FERMAT CAPITAL MANAGEMENT, LLC; MR. RICH POWELL, EXECUTIVE DIRECTOR, CLEARPATH; AND MS. MAGGIE MONAST, DIRECTOR, WORKING LANDS, ENVIRONMENTAL DEFENSE FUND

STATEMENT OF DR. JOANNA SYROKA

Dr. SYROKA. Thank you, Chair Castor, Ranking Member Graves, and the members of the Select Committee.

As the chair said, my name is Joanna Syroka. I am a Senior Underwriter and Director of New Markets at Fermat Capital Management. Based in Connecticut, Fermat is one of the largest and most experienced investment managers in insurance-linked securities, or ILS for short.

ILS are financial investments whose losses are directly linked to insured loss events, such as wildfires, floods, hurricanes, and earthquakes. To be clear, investors lose money when these events occur. ILS effectively convert the global bond markets into the largest de facto insurance company ever seen. By doing so, ILS has the potential to absorb catastrophe risks far better than the traditional insurance industry. The current market is just over 90 billion in size, but as climate risks and other risks outpace insurance supply, we foresee substantial market growth ahead.

Some of the largest institutional investors in the world invest in ILS, usually through specialist companies like mine. An ILS investment manager has the duty to watch for even the slightest change in climate trends and integrate them into their investment processes. In this way, ILS provides society with a forward-looking, market-based indication, or price, of the costs of weather risks and, consequently, climate change.

The U.S. is the cradle of the ILS market. It was born in the late 1990s, after Hurricane Andrew in 1992 and the Northridge earthquake in 1994, causing the collapse of insurance markets in Florida and in California. Since then, ILS has increasingly helped stabilize the U.S. insurance market, narrow the insurance protection gap, and reduce insurance costs for homeowners and businesses. How-

ever, as society responds to risks such as climate change and as new regulations are introduced to enforce climate-related guidelines, we believe ILS will play an even greater role in a more climate and disaster resilient future.

ILS enjoys significant governmental support abroad. They are already helping emerging economies and other public entities to manage systemic catastrophe risks with an efficient pre-event approach, rather than an inefficient post-event approach to disaster response. Prearranged financing with timely, reliable, and transparent triggers for funding, significant funding flows, particularly when embedded in broader risk management programs, can significantly increase the efficacy of disaster financing and planning while promoting resilience for the long run.

In the U.S., ILS is already a core component of residual homeowner insurance programs in states like Florida, Louisiana, North Carolina, and Texas. They are helping the State of California better manage its wildfires. The MTA uses ILS to cover storm surge losses to the New York City subway system. And the ILS market is helping the National Flood Insurance Program back claims after flood disasters without additional supplementals from Congress. A hallmark of our market has been innovation. ILS could quite easily be used more broadly in public-private partnerships to help communities across this nation recover and rebound in weather catastrophes.

As an ILS investment manager, we see firsthand that global investors are actively seeking positive ESG investment opportunities, and we believe that ILS are inherently aligned with such positive principles. In short, while the need is great and growing, the capital required to set against this country's most pressing extreme climate risks is on standby to being deployed.

To facilitate this, we have the following recommendations to the Select Committee. Congress can help bring the ILS market machinery onshore, which would make the market more accessible to private and public entities who lack the resources to tap the ILS market offshore. My written testimony contains more details, but such a step would also create jobs and valuable know-how in a new and expanding area of financial resilience.

FEMA is already a pioneer in ILS. Congress should adopt key recommendations on technical assistance from the Select Committee's majority staff report so that communities, municipalities, states and others have access to the expertise they need to follow in FEMA's footsteps.

Congress should also adopt pertinent recommendations on insurance and innovative risk transfer from the Select Committee's majority staff report, and consider legislation to encourage Federal agencies to work with the private sector to better manage and transfer the climate risks.

We believe these steps would significantly reduce the burden of catastrophe costs on taxpayers and would help accelerate resilient recovery in times of disaster, while creating the insurance tools required to manage the climate and other risks that we face ahead in the 21st century.

Thank you for the opportunity to testify today, and I look forward to answering any questions that you may have.

[The statement of Dr. Syroka follows:]

Testimony of Joanna Syroka

Senior Underwriter and Director of New Markets, Fermat Capital Management, LLC

Before the Select Committee on the Climate Crisis

“Creating a Climate Resilient America: Strengthening the U.S. Financial System and Expanding Economic Opportunity”

October 1, 2020

Good afternoon, Chair Castor, Ranking Member Graves, and members of the Select Committee, my name is Joanna Syroka, and I am a senior underwriter and director of new markets at Fermat Capital Management. Based in Westport, Connecticut, Fermat is one of the largest and most experienced investment managers in Insurance-Linked Securities, or ILS for short.

ILS are financial investments whose losses are directly linked to insured loss events such as wildfires, floods, hurricanes and earthquakes. To be clear: investors lose money when these events occur. ILS are most often used by insurers and reinsurers to transfer catastrophic risks that stress their balance sheets the most directly to the capital markets where capacity for such risks is greater.[1] This frees up capital, allowing insurers to provide more coverage to the areas that demand it and to support homeowners, businesses and vital economic activity in all geographies in the United States. As governments act as the “insurer of last resort”, many governments and public entities around the world—including the U.S. federal government—are also issuing ILS to manage their obligations in times of disaster. ILS effectively convert the global bond market into the largest de facto insurance company ever seen. By doing so, they have the potential to absorb catastrophe risks far better than the traditional insurance industry. The current ILS market stands at over US\$90 billion in size, but as climate and other risks outpace insurance supply, we foresee substantial market growth ahead.[2]

Some of the largest institutional investors in the world invest in ILS, usually through specialists like my company. Our portfolios, like the ILS market, are predominantly U.S. focused and primarily exposed to U.S. weather risks, such as hurricanes, floods, tornadoes and wildfires, as well as earthquakes and other catastrophe risks. As such, the ILS market—like the insurance and reinsurance markets it supports—is at the forefront of monitoring changes in weather extremes and their impact on economies. Unlike long-duration investments like equities, traditional bonds and real estate, ILS are more short-term in nature (maturities typically range from one to five years) and can, therefore, reprice their returns in the relative near term as new information about the frequency and severity of weather events becomes available. As a leading manager in this space, we continually monitor events and check our models and benchmarks for any potential changes in extreme weather activity, seeking to detect and integrate emerging climate trends into our investment processes. This ongoing feedback loop is critical to the functioning of the ILS market, creating a “climate linker” market architecture within which ILS can be thought of as “climate-indexed floating rate” investments. In this way, investors and ILS issuers alike are provided with a forward-looking, market-based indication—or price—of the costs of weather risks and, consequently, climate change. The insurance and ILS markets are uniquely placed to provide this essential price discovery function to society.

The United States is the cradle of the ILS market. It was born in the late 1990s after two events—Hurricane Andrew in 1992 in suburban Miami and the Northridge Earthquake in 1994 in suburban Los Angeles—caused a near-collapse of the insurance markets in Florida and California. These disasters created an opportunity for capital market investors to provide new capital to the insurance sector. Since then, ILS have had an increasingly important role in helping stabilize the U.S. insurance market through the sharing of risks across a broader and deeper capital pool and in narrowing the insurance protection gap by increasing the available insurance capacity for catastrophe risks. By providing multi-year protection against events so large that any traditional reinsurer’s solvency would be called into question, ILS have reduced insurance costs for U.S. homeowners and businesses and have helped ensure that coverage remains stable *nationwide* in the aftermath of a

major catastrophe.[3] However, as society responds to risks such as climate change—by shifting towards a low-carbon economy, investing in risk mitigation and adaptation measures, and as new regulations are introduced to enforce climate-related guidelines—we believe ILS will have an even greater role to play in building a more climate and disaster-resilient future.

ILS are already helping emerging economies rebound from disasters quicker and enjoy significant governmental support abroad. They enable governments and other public entities to manage systemic catastrophe risks with an efficient, pre-event approach—rather than an inefficient, post-event approach to disaster response. Pre-arranged financing with timely, reliable and transparent triggers for funding flows, when embedded within broader disaster risk management programs aimed at reducing the impact of disasters on local economies and that include contingency plans for how communities build back better, can significantly increase the efficacy of disaster financing and planning, while promoting resilience for the long-run. For example, the World Bank has been enabling client countries, such as Chile, Columbia, Mexico, Peru and the Philippines, to manage their natural catastrophe risks with catastrophe bonds, the best-known type of ILS, since 2009.[4] These bonds use triggers based upon transparent and objective parameters of an event, such as the central pressure of a hurricane, that can unlock capital quickly and efficiently when disaster strikes to respond to areas in need. The U.K.’s terrorism insurance pool issued a terrorism risk catastrophe bond in 2019, with the aim of further distancing Her Majesty’s Treasury and the U.K. taxpayer from any liability in the event of a major claim due to a large terrorism attack (or attacks).[5]

In the U.S., ILS are already a core component of residual homeowner insurance programs in states like Florida, Louisiana, North Carolina and Texas, ensuring they can pay claims after hurricanes and remain solvent to provide coverage for the next year.[6] They are helping utility companies in California better manage their wildfire risk and reduce the risk for the communities they serve.[7] The Metropolitan Transportation Authority (MTA) uses catastrophe bonds to cover storm surge losses to the New York City subway system.[8] Catastrophe bonds are helping the National Flood Insurance Program (NFIP) ensure it can pay claims after flood disasters without additional supplemental appropriations from Congress.[9] A hallmark of our market has been innovation, and there is no reason why ILS could not be used more broadly in public-private partnerships to help communities across the nation recover and rebound more quickly from weather catastrophes and reduce the need for post-disaster federal outlays.

As an ILS investment manager, we see first-hand that global investors are actively seeking positive Environmental, Social and Governance (ESG) investment opportunities that support the United Nations Sustainable Development Goals and we believe that ILS are inherently aligned with such positive principles. As outlined above, on the **environmental** front, ILS provide a market-based pricing mechanism giving an essential signal of the relative benefits of climate risk mitigation and adaptation measures to communities, creating a powerful feedback loop that aligns incentives for better risk management in the long term. On the **social** front, ILS are already helping to stabilize insurance markets, allowing them to support sustainable economic activity and reduce the economic impact of disasters on citizens. With respect to **governance**, ILS enable companies and governmental entities to manage systemic catastrophe risks with a rational, forward-looking approach—rather than an inefficient, after-the-fact approach—with significant multiplier effects for economies and society. For these reasons, our asset class has received significant attention from investors who are increasingly considering these qualities in their investments. In short, while the need for insurance capacity is great and growing, the capital required to set against this country’s most pressing extreme weather risks is on stand-by to be deployed.

To facilitate this, we have the following recommendations to the Select Committee:

1. Congress can take measures to help bring the ILS market onshore, which would make it more accessible to private and public entities who lack the resources or find it operationally difficult to do business offshore yet desire to tap the market. Currently, all catastrophe bonds and ILS are issued offshore in jurisdictions that have favorable regulatory and tax treatments for the special purpose insurers (SPIs) that are used to create and issue these securities. In the U.S., these SPIs are classified and therefore taxed at the federal level as corporations, making it prohibitively expensive to securitize catastrophe risks onshore. Allowing a so-called “pass-through tax status” for ILS SPIs would remove this impediment and enable ILS to be issued onshore. If implemented correctly, such pass-through legislation would result in a pure gain in revenue to the federal government. Bringing the market onshore would mean municipalities, states and other public entities would be freer to cede their

risk to the capital markets and create programs to manage that risk with an efficient, pre-event approach. Moreover, such a step would also create jobs in the U.S. with valuable know-how in a new and expanding area of financial resilience, and generate opportunities in data, science and cutting-edge technologies in disaster risk mitigation as on-the-ground programs are created.

2. The Federal Emergency Management Agency (FEMA), through the NFIP, is already a pioneer in catastrophe bonds. Congress should adopt key recommendations on technical assistance from the Select Committee's majority staff report, "Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America", so that entities seeking to access the ILS market—such as communities, municipalities and states—can optimally leverage existing experience and programs and have access to the expertise they need to follow in FEMA's footsteps.

3. Congress should also adopt pertinent recommendations on insurance and innovative risk transfer from the Select Committee's majority staff report, "Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America", including:

- Increasing the role of insurance and innovative finance to support rapid and resilient recovery from disasters.
- Strengthening the NFIP by, among other things, providing community-wide flood insurance.
- Directing FEMA to evaluate and report on the use of innovative risk transfer mechanisms such as parametric insurance and catastrophe bonds to cover assets that are eligible for Stafford Act Category E funds.

4. Congress should consider legislation to encourage federal agencies to work with the private sector to better manage and transfer climate risk.

We believe these steps would significantly reduce the burden of catastrophe costs on taxpayers and help accelerate resilient recovery in times of disaster, while creating the insurance tools required to manage the climate, and other, risks ahead in the 21st century and ensuring the nation can finance and support continued economic growth in all geographies.

Thank you for the opportunity to testify today to the House Select Committee on the Climate Crisis and I look forward to answering any questions you may have.

REFERENCES:

- [1] Reinsurers are companies that insure insurance companies.
- [2] *ILS Annual Report 2020*, Aon, September 28, 2020. Available at: http://thoughtleadership.aonbenfield.com/Documents/280920_aon_securities_ils_annual_2020_update.pdf
- [3] *Alternative Capital and Its Impact on Insurance and Reinsurance Markets*, Robert P. Hartwig and James Lynch, Insurance Information Institute, March 2015. Available online at: https://www.iii.org/sites/default/files/docs/pdf/paper_alternativecapital_final.pdf. See also: *ILS: "Taller" Than You Might Think*, John Seo, presented to the Federal Insurance Office, U.S. Department of the Treasury, November 4, 2015. Available online at: https://home.treasury.gov/system/files/311/Fermat_Capital_Presentation.pdf
- [4] E.g. see *World Bank Catastrophe Bond Provides Financial Protection to Mexico for Earthquakes and Named Storms*, World Bank, March 9, 2020. Available online at: <https://www.worldbank.org/en/news/press-release/2020/03/09/world-bank-catastrophe-bond-provides-financial-protection-to-mexico-for-earthquakes-and-named-storms>
- [5] *Placed World's First Terrorism Insurance-Linked Security (ILS) of £75m*, Pool Re, 2019. Available online at: <https://www.poolre.co.uk/history/placed-worlds-first-terrorism-insurance-linked-security-ils-of-75m/>
- [6] The most recent transaction of this kind was by the Texas Windstorm Insurance Association in June 2020, see *TWIA's New Alamo Re 2020 Cat Bond Doubles in Size to \$400m*, Artemis, June 1, 2020. Available at: <https://www.artemis.bm/news/twias-new-alamo-re-2020-cat-bond-doubles-in-size-to-400m/>
- [7] E.g. Sempra Energy, see *Sempra Energy's SD Re 2020-1 Wildfire Cat Bond May Upsize to \$90m*, Artemis, July 2, 2020. Available at: <https://www.artemis.bm/news/sempra-energys-sd-re-2020-1-wildfire-cat-bond-may-upsize-to-90m/>
- [8] See *New York's MTA Sells Storm Bond: Agency Gets Creative in Disaster Planning as Usual Sources of Insurance Dry Up*, Wall Street Journal, July 31, 2013. Available at: <https://www.wsj.com/articles/SB10001424127887323681904578640401075075198>
- [9] More information on NFIP's reinsurance program and catastrophe bond issuances can be found online at: <https://www.fema.gov/flood-insurance/work-with-nfip/reinsurance>

Ms. CASTOR. Thank you very much.

Mr. Powell, you are recognized for 5 minutes.

STATEMENT OF MR. RICH POWELL

Mr. POWELL. Good afternoon, Chair Castor, Ranking Member Graves, and members of the committee. I lead ClearPath. We advance conservative policies that accelerate clean energy innovation across all zero-emission resources. An important note, we receive no industry funding.

We believe this Select Committee plays an important role in America's response to the global climate challenge. We commend Chair Castor and Ranking Member Graves for holding this important hearing on reducing the risks of climate change.

I plan to cover, first, climate change and its economic risks; second, reducing these risks through global emissions mitigation and local adaptation; third, the challenges of changing developing countries' emissions trajectories; fourth, a strategy for America to lead on solving the global climate challenge; and fifth, opportunities to build on last Congress' bipartisan clean innovation record.

Climate change is real. Global industrial activity is the dominant contributor, and its risks to society merit significant action at every level of government and private sector. Earlier this month, as we have heard, a CFTC subcommittee led by Commissioner Behnam issued a report finding climate change could pose systemic risks to the U.S. financial system.

According to NOAA, just 14 extreme weather events in 2018 caused \$93.5 billion in damages. The Wharton Risk Center recently found a federally insured, mortgage-backed securities account for more than 60 percent of our outstanding mortgage debt, tripling to \$6.7 trillion since 2000. American taxpayers will inevitably foot this bill, subsidizing the risky choices of those remaining in harm's way. This system is unsustainable.

Now, how to respond. To start, we can do much to adapt to climate risk with smarter resilience policies. According to FEMA, every dollar spent on pre-disaster mitigation saves, on average, \$4. Louisiana's Coastal Protection and Restoration Authority Master Plan, for example, would spend \$950 million in fiscal year 2021 as part of their 50-year, \$50 billion resilience and restoration plan.

On mitigation, the science of climate change is harsh. The global atmosphere responds the same way to every ton of greenhouse gases. A molecule of CO₂ from Birmingham has the same effect as one from Beijing. No country can single-handedly mitigate global climate risk. And every country must take care, lest its policies risk domestic economic damage with little climate outside. Or even worse, so-called leakage of their energy intensive industries as well, increasing emissions. These realities, however, are no excuse for inaction. Rather, they simply require us to design U.S. policy responses heed toward global emission reduction; a massive innovation challenge.

Let's take a look around the world. Despite tremendous progress, India, for example, still has 178 million people without reliable electricity. Why? Well, in 2018, the International Energy Agency found that when Indians could access electricity, it was on average twice as expensive as in the U.S. The share of global energy supplied by clean sources have barely increased since 2005. In other words, clean development is only just keeping up with economic development. Clean is not gaining ground. Clean technology systems

must come to represent better, cheaper alternatives that are reliable 24/7, 365, so developing nations consistently choose them.

If America does not provide the world with affordable and reliable clean energy, developing countries will continue reliance on our adversaries, China and Russia. In addition to its major build of new domestic coal, China is financing and building nearly 100 gigawatts more in other developing countries through Belt and Road, all without carbon capture, locking in emissions for decades.

To meet this challenge, we must greatly increase pace and ambition. There are four legs to success. First, we must innovate. Major technology demonstrations would prove the viability of a portfolio of 24/7 clean technologies at full scale, covering everything from grid-scale storage and enhanced geothermal to carbon capture and advanced nuclear.

Second, we must remove unnecessary regulatory hurdles needlessly slowing down projects. This includes new source review reforms, as Representative Griffith has recommended, and the processes around NEPA. Ranking Member Graves' BUILDER Act, H.R. 8333, for example, introduced last week, would remove barriers and accelerate the deployment of clean energy technologies.

Third, we must build enough of this new technology to bring down costs. Smart incentives help innovators learn by doing. Delivering the technologies here in the 2020s, the developing countries can deploy in the thirties and forties.

Fourth and finally, we must export the proven technology to new clean energy markets. Global energy trends will decline when we have products and export support ready for rapidly growing countries like Nigeria to buy. No country will use a single clean power technology. Every country will need to find the right mix, given its national circumstances, resource endowments, and preexisting industry.

We hope policymakers will work towards a bipartisan solution based on the principle of more innovation and less regulation for clean technologies before the end of this Congress. There are a number of House-passed bills that, if appropriately combined with pending Senate legislation, will create moonshots for E-clean technology. To address climate change, we must develop every tool to achieve clean, reliable, affordable, and exportable energy.

Thank you again for this opportunity, and I look forward to the discussion.

[The statement of Mr. Powell follows:]

Testimony of Richard J. Powell

Executive Director, ClearPath

House Select Committee on the Climate Crisis

Creating a Climate Resilient America: Strengthening the U.S. Financial System and Expanding Economic Opportunity

Good afternoon Chair Castor, Ranking Member Graves and members of the Committee. My name is Rich Powell, and I am the Executive Director of ClearPath.

ClearPath is a 501(c)3 organization whose mission is to develop and advance conservative policies that accelerate clean energy innovation. We support solutions that promote a wide array of clean energy technologies—including next-generation nu-

clear, hydropower, fossil fuels with carbon capture and grid-scale energy storage. Our core mission advocates markets over mandates and bolstering technological innovation while easing regulatory bottlenecks. ClearPath provides education and analysis to policymakers, collaborates with relevant industry partners to inform our independent research and policy development, and supports mission-aligned grantees. An important note: we receive zero funding from industry.

We believe this Select Committee plays an important role in America's response to the global climate challenge. I commend Chair Castor and Ranking Member Graves for holding this important hearing on reducing the risks of climate change.

With this in mind, I will discuss a few topics today to help achieve clean, reliable, affordable and exportable energy in the U.S.:

- First, the reality of climate change and its risks to our economy.
- Second, how the nature of these risks call for global emissions mitigation and local climate adaptation.
- Third, the realities and challenges we face on the global level due to the appetite for energy and new industrial activity of developing countries.
- Fourth, a strategy going forward for America to lead on solving the climate challenge.
- Fifth, opportunities to build on last Congress' bipartisan clean innovation record to improve clean energy's competitiveness globally.

1. Climate change risks to the U.S. economy and financial system

First, the elephant in the room: Climate change is real, industrial activity around the globe is the dominant contributor, and the challenge it poses to society merits significant action at every level of government and the private sector. It is too important to be a partisan punching bag. Climate change deserves a pragmatic and technology-inclusive agenda to make the global clean energy transition cheaper and faster.

Earlier this month, the Commodity Futures Trading Commission issued a report, *Managing Climate Risk in the U.S. Financial System*, that finds climate change could pose systemic risks to the U.S. financial system.¹ While it notes that significant uncertainty remains in the climate projections and their potential effects on our financial system, it argues that prudent economic management calls for "err[ing] on the side of caution if we are to maintain the relative stability and proper functioning of our market economies."

For example, analysis from the Risk Center at the Wharton School recently demonstrated how the federal mortgage finance system will face multiple challenges due to climate risks. According to Wharton, mortgage-backed securities insured by the federal government through Fannie Mae, Freddie Mac, or FHA/VA programs account for more than 60 percent of the outstanding residential mortgage debt in the United States, totaling \$6.7 trillion.² This is up from \$2.5 trillion in 2000.

According to the National Oceanic and Atmospheric Administration (NOAA), this accumulation of financial risk is occurring in the face of 14 individual weather and climate events doing at least \$1 billion in damage in 2018, totaling \$93.5 billion in total damages.³ Additionally, a 2017 report by the Inspector General found that only 42 percent of the Federal Emergency Management Agency's (FEMA) flood maps correctly identified flooding risk at this point.

In some jurisdictions prone to flooding, exacerbated by sea level rise, private insurers have already largely withdrawn leaving the public options—either the National Flood Insurance Program or FEMA emergency spending, as an ever growing public liability.⁴

This trend will likely continue to worsen. As climate-related exposure continues to increase, those impacts will be felt in securities backed by the federal government, with higher costs passed on to Americans as a result. This also subsidizes the risky choices of those remaining in harm's way. In other parts of the country, excessive regulation of home insurance is leading to unsustainable mandates to maintain coverage of fire risk, for example, impeding accurate pricing and risking a further withdrawal of private insurers and an inevitable demand that more federal dollars subsidize the vulnerable. This system is unsustainable.

¹ *Commodity Futures Trading Commission (CFTC), "Managing Climate Risk in the U.S. Financial System" (Forward, XIX)*

² *Wharton, University of Pennsylvania, "Can the Federal Mortgage Finance System Help Manage Climate Risk?"*

³ *National Oceanic and Atmospheric Administration, "Billion-Dollar Weather and Climate Disasters: Events"*

⁴ *Amine Ouazad, Matthew E. Kahn, "Mortgage Finance in the Face of Rising Climate Risk"*

2. Climate risks call for global emissions mitigation and local adaptation

The harsh reality of global climate change is that the global atmosphere responds the same way to a ton of greenhouse gases regardless from where it is emitted. A ton from the United States today has an identical effect as a ton from Nigeria, India, Indonesia, and China today, or in the years to come. This makes combatting the risks from climate change necessarily a global issue. No country can single-handedly mitigate global climate risk. Indeed, the United States, while a major historical contributor, now emits 15 percent of global emissions, and our share is dropping as those of rapidly developing countries rise.

This must never be taken as an excuse for inaction. Rather, the key to mitigating the risks of global climate change is designing U.S. policy responses keyed towards global emissions reductions—a massive innovation challenge discussed below. As well, the U.S. must be wary not to drive emitting industries across our borders and to other jurisdictions in developing countries with cheaper inputs and lax environmental controls—a phenomenon known as emissions leakage that *risks* increasing global emissions. Nor should we risk policies that are so harmful to our own markets and financial systems that they do more harm than good to our economy.

Even as we pursue a strategy of global climate risk mitigation via clean technology diffusion, state and local jurisdictions can do much to lessen climate risk with smarter adaptation and resilience policy.

Since 1980, the United States has spent \$1.75 trillion in disaster recovery from 258 “billion-dollar events.” From 2014 to 2018, the United States saw an average of 13 billion-dollar disasters every year. This is all deficit spending. If we don’t better prepare, we will further increase deficit spending. According to FEMA, every \$1 spent on pre-disaster mitigation saves on average \$4.

The current, tragic wildfires in California, and some of the proposed policy responses, present a potential example of how these mitigation and adaptation priorities can be conflated and risk doing more harm than good. While a global response to climate change will eventually reduce the risk of uncontrollable wildfires in California, the absolute near-term priority in the state must be on better climate resilience and adaptation policy—a huge step up in forest and vegetation management—if large portions of the state are to remain livable. Calls for tripling down on mitigation policy within California’s borders as a near-term fire risk reducer, as some have suggested,⁵ risk providing citizens with false hope and distracting from the essential local task of reducing the massive accumulated fuel load ready to burn across the West.

Louisiana’s Coastal Protection and Restoration Authority master plan is a great example of long-term resilience efforts at the local level. In Fiscal Year 2021, they plan to spend more than \$950 million as part of their 50-year, \$50 billion master plan for hurricane surge risk reduction and coastal restoration projects.⁶

3. Global energy realities

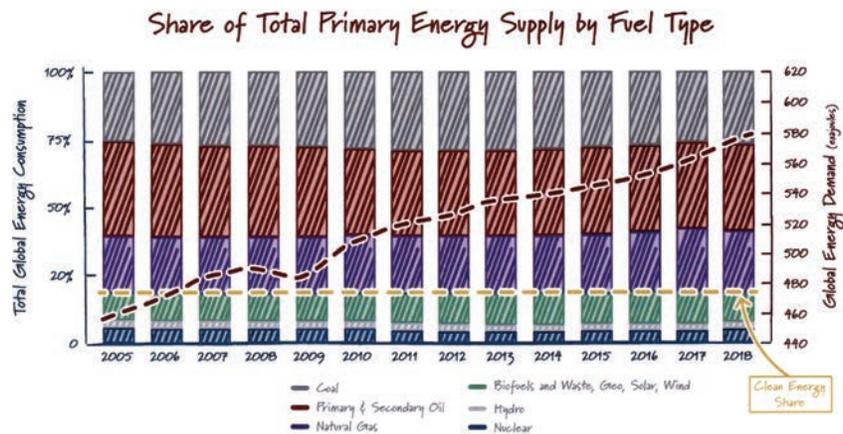
To have a debate about climate change rooted in political and technical realism, as well as economic competitiveness, we need to understand the needs of the rest of the world. Developing countries have an insatiable energy appetite.

As populations and economies grow, they are demanding more and more affordable energy options. Let’s take a look around the globe—hundreds of millions of people in Asia and Africa continue to lack basic necessities for human development and public health linked to clean electricity, like lights in their hospitals and clean air to breathe. India has some of the dirtiest air and one of the largest populations without reliable electricity access in the world. Despite tremendous progress, India still has 178 million people without reliable electricity and is home to 22 of the world’s 30 most polluted cities.

Why does so much of India lack reliable electricity? Ultimately, it costs too much. In 2018, the International Energy Agency (IEA) found *when* Indians could access electricity, it was on average twice as expensive as in the United States, adjusted for purchasing power. And that’s for electricity far dirtier than U.S. electricity. In the early days of the coronavirus lockdowns, India relied on coal for 72 percent of their electricity, while the U.S. was down to 17 percent—and U.S. coal plants have far more modern environmental controls. This illustrates the significant hurdle we need to achieve on affordability and performance for new zero-emissions technologies.

⁵ California Governor Gavin Newsom held a press conference, 9.11.20

⁶ Louisiana Coastal Protection and Restoration Authority



The current energy choices available to developing nations are simply not up to the task of rapid global decarbonization. Despite significant global renewables deployment, emissions continue to rise. The share of global energy supplied by clean sources has barely increased since 2005. In other words, clean development is only just keeping up with economic development; clean is not gaining ground. Clean technology must come to represent a better, cheaper alternative that is reliable 24/7/365 so developing nations consistently choose it over higher-emitting options. We must remember that developing nations are building energy *systems*, not just individual plants, and must take into account the overall system costs of new energy sources. For example, a reliable energy system based on variable wind and solar also must incorporate the costs of additional transmission to load centers, along with either over-build in the generation to account for variability given their capacity factors, or short and long duration storage to smooth out that variability, or flexible, usually emitting, back-up generators which increase emissions. All of these add to the costs of a system.

It's also unlikely that this story will change any time soon unless new clean technologies become market competitive. China built new coal plants roughly 20 percent the size of the entire U.S. coal fleet last year. Despite China's recent net-zero pledge, they continue to greenlight dozens of new coal power plants without carbon capture today, which will 'lock in' emissions for decades to come.⁷ China's climate problem is our climate problem, just like their virus problem became our virus problem.

If America does not provide the rest of the world with affordable and reliable clean energy technologies, developing countries will turn to our adversaries, partnering with countries like China and Russia, who view the spread of their technology as a way to expand their power while weakening the United States. In other words, by failing to develop affordable clean energy sources of all kinds, we not only fail to solve the climate issues at hand but also threaten our own national security and geopolitical position.

China and Russia have gained the upper hand in energy exports by leveraging state-owned enterprises to achieve their economic and political interests. The aforementioned Belt and Road initiative that China is pursuing relies heavily on state-owned enterprises to achieve its goals. By project value, as of last October, 70 percent of Belt and Road projects were contracted to state-owned enterprises. These state-owned enterprises seek to achieve the strategic objectives of the initiative: to use economics to promote politics and to combine politics and economics.⁸ They seek to achieve these objectives with more than just financial backing from China. The Chinese government offers policy, performance evaluation, and risk management and analysis to these companies to make them more effective.

⁷Institute for Energy Economics & Financial Analysis, "China at a Crossroads: Continued Support for Coal Power Erodes Country's Clean Energy Leadership"

⁸The Lowy Institute, "China's Belt and Road Initiative, from the inside looking out"

As for Russia, they also utilize state-owned enterprises to achieve their goals. Their state-owned nuclear company, Rosatom, reports that at least 33 plants are currently planned for development. Whereas the United States historically led the world in peaceful and safe nuclear technology exports, Russia has attempted to corner the global market, positioning themselves as the leading exporter with more than a dozen plants currently being built in countries like Turkey, Bangladesh, India and Hungary.⁹ China is close behind Russia, having increased nuclear exports under the belief that more nuclear energy proliferation will make the world more peaceful while also supporting their economic goals.¹⁰

We should also note that our global competitors and their state owned enterprises (who control roughly 90% of known oil and gas reserves) do not fall within the same voluntary corporate governance regimes currently being constructed by the growing number of U.S. and European investors with an ESG focus. While those regimes can helpfully encourage investment in cleaner resources and consideration of the physical risks of climate change in business planning, we should take care that they do not unduly disadvantage or re-direct investment out of higher efficiency, cleaner operating American companies and into the hands of their sovereign-owned global competitors who are subjected to little environmental scrutiny or regulation. For example, the National Energy Technology Laboratory study has found that Russian natural gas exported to Europe has lifecycle greenhouse gas emissions over 40% higher than U.S. liquified natural exported to Europe. Policies that give Gazprom a competitive advantage over U.S. LNG are policies that will result in higher global emissions.¹¹

These examples illustrate both the economic potential and the pitfalls of inaction present in this debate. The markets America could serve are vast, and the trade benefits we can experience are huge, if we are the first to develop truly scalable clean energy solutions and craft a cohesive plan for international deployment assistance. More broadly, continuing an innovation-focused approach to American clean energy dominance will cement our geopolitical gains from the shale revolution, ensuring we continue as the global energy superpower throughout the 21st century.

4. A roadmap to global climate change mitigation

Given the scale of the climate challenge, we need to greatly increase the pace and ambition of our efforts. ClearPath has laid out four legs to success.

First, we must innovate. That means developing clean technologies the world wants to buy that give America a competitive advantage. Big energy projects can't be done in someone's basement with a small angel investor like a new food delivery app. And we must drive progress with public investments in close partnership with the private sector, with very clear accountability at DOE to produce huge cost and performance improvements.

Second, we must limit excessive regulatory hurdles that needlessly slow down clean energy workers. Members of this Committee are supporting important reforms to the National Environmental Protection Act (NEPA), for example. The efficient permitting of projects is essential to effectively using scant taxpayer resources and to scaling clean energy deployment rapidly. We can only build clean energy technologies and put more energy workers back on the job as fast as we can permit the projects.

Ranking Member Graves' BUILDER Act (H.R. 8333), for example, introduced last week, would remove barriers and accelerate the deployment of clean energy technologies.

Third, we must demonstrate how the technology works. Let's work with the utility companies and private sector making bold net-zero emissions commitments, not against them. Congress is working on authorizing bills to cost share federal demonstration programs, incentivize demonstrating new technology via tax credits, and smooth the regulatory path to deploying these at scale, driving affordability.

America's largest electric utilities—with more than 22 investor-owned utilities setting net zero by 2050 goals—include North Carolina-based Duke Energy and Georgia-based Southern Company, which operates the largest grid in the country. According to the Smart Electric Power Alliance, 68 percent of all electricity customer accounts in the country are now served by a utility with a significant carbon emissions reduction goal, and 19 of the 48 companies setting goals are for net-zero or

⁹*The Economist*, "Russia leads the world at nuclear-reactor exports"

¹⁰*Carnegie Endowment for International Peace*, "The Future of Nuclear Power in China: Introduction"

¹¹*Department of Energy, National Energy Technology Laboratory*, "Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States"

carbon-free power by 2050.¹² These electricity producers have been virtually uniform in stating that the technology does not exist today to achieve these goals affordably and reliably, and that Federal policy should focus on identifying and demonstrating affordable, flexible clean energy resources like carbon capture, advanced nuclear, grid scale storage, geothermal and clean hydrogen—along with carbon dioxide removal technologies like direct air capture that could allow them to offset any remaining fossil plants’ emissions by 2050.

Corporate commitments go well beyond the energy industry. Walmart’s “Project Gigaton” is aimed at reducing 1 gigaton of greenhouse gas emissions from their supply chain by 2030 and going carbon neutral by 2040. Microsoft has committed to reducing its emissions to zero—and then some—promising to remove all the emissions it has ever created over its lifetime. These commitments share a need for bold new technology.

Fourth, we must export the proven technology and create new clean energy markets. Everything we are innovating and demonstrating must not only have a niche in our own energy sector, but also apply to countries like India, Tanzania or Indonesia that are growing exponentially—and consider what they would be willing and able to buy from us. In turn, we must carefully avoid near-term policies that lock in exclusive investments towards immediately available, higher cost resources because doing so will divert resources from the solutions that are exportable.

America has several levers to ensure our technology offerings are competitive with countries who do not share our interests or values. These include engagement with the international community in financing like the U.S. International Development Finance Corporation (DFC)—created by the Better Utilization of Investments Leading to Development (BUILD) Act of 2018 from the Overseas Private Investment Corporation (OPIC)—and the Export Import Bank, along with bilateral and multilateral engagement on clean energy exports and technology transfer in forums like the Clean Energy Ministerial.

For the past decade, the United States has ceded leadership on international energy development to China and Russia, threatening the climate, our national security and American economic growth. However, on July 23, the U.S. took a massive step towards reclaiming our role as the primary exporter of vital clean energy technologies by lifting the nuclear financing moratorium at the DFC. Financing nuclear projects will open the door for U.S. advanced nuclear technologies to lead the development of clean energy for emerging economies.

Similarly, America needs to work to ensure that restrictions on clean energy projects do not exist at international organizations we participate in like the World Bank. Finally, the continued authorization of the Export Import Bank is key to ensuring the export of energy technologies internationally.

5. Near-term bipartisan policy opportunities to change global emissions

The 115th Congress did not receive appropriate credit for boosting low-carbon technologies. The broadly bipartisan agenda enhanced critical incentives for carbon capture, renewables and advanced nuclear. It invested in the U.S. Department of Energy (DOE) research and development (R&D) at record levels, and it reformed regulations to accelerate the licensing of both advanced nuclear reactors and hydropower. The 45Q tax incentive for carbon capture and storage technology is a perfect example—it was supported by a vast bipartisan coalition from environmental organizations to organized labor to utilities to coal companies. Notably, seven national unions recently collectively re-emphasized the importance of including carbon capture and nuclear in any national clean energy policy. Lastly, the creation of the Development Finance Corporation through the BUILD Act greatly improved the prospects for American clean technologies internationally.

This Congress has a great opportunity before you to pass bipartisan clean energy innovation legislation. The very bipartisan Senate American Energy Innovation Act (S. 2657) may well pass the floor of the Senate this week. The Senate bill starts a suite of moonshots for key clean innovation technologies we’ll need to decarbonize affordably and reliably—including 17 major new technology demonstrations by 2025 of grid scale storage technologies, enhanced geothermal systems, fossil fuels with carbon capture, and advanced nuclear reactors. This could set up a potential conference with a number of the bipartisan measures either passed out of or under consideration in the House Science, Space and Technology committee and the Energy and Commerce committee, such as:

¹²Smart Electric Power Alliance, “Utilities’ path to a carbon-free energy system by 2050”

- **H.R. 2986**, the Better Energy Storage Technology Act, which would facilitate the research, development, and demonstration of next-generation grid-scale energy storage systems.
- **H.R. 3306**, the Nuclear Energy Leadership Act, which would expand nuclear research, development, demonstration, and commercialization efforts at the Department of Energy.
- **H.R. 1760**, the Advanced Nuclear Fuel Availability Act, which ensures that advanced fuel is available for the next generation of nuclear reactors.
- **H.R. 3607**, the Fossil Energy Research and Development Act, which would reauthorize and expand fossil energy related R&D and establish an innovative new “Climate Solutions Challenges” prize competition at DOE.
- **H.R. 4091**, the ARPA–E Reauthorization Act of 2019, which would extend and expand ARPA–E support for transformative energy technologies.
- **H.R. 4230**, the Clean Industrial Technology Act, which would establish an emissions- reduction technology program to reduce industrial sector greenhouse gas emissions.
- **H.R. 5374**, the Advanced Geothermal Innovation Leadership Act, which would support R&D in advanced geothermal energy resources.
- **H.R. 5428**, the Grid Modernization Research and Development Act, which would authorize a broad range of R&D activities to enhance the resilience and readiness of the electric grid for a low-carbon future.
- **H.R. 6084**, the Water Power Research and Development Act, which would provide a program at DOE for the research, development, demonstration, and commercialization of water power technologies.
- **H.R. 3597**, the Solar Energy Research and Development Act, which would accelerate the next generation of solar energy technologies by expanding DOE efforts to improve the capacity, efficiency, manufacturing, reliability, and affordability of solar energy.
- **H.R. 3609**, the Wind Energy Research and Development Act, which would extend and expand the wind energy technology, research, development and testing program at DOE.

We hope policymakers will work towards a bipartisan solution based on the principle of more innovation and less regulation for clean technologies before the end of this Congress.

Major, lasting energy and environmental policy has nearly always been bipartisan on passage. We believe climate policy that sustainably solves the global challenge cannot be done in a partisan manner. Bipartisan cooperation on climate change is the only chance our nation has if it is going to play a significant role in the global solution.

To address a massive global challenge like climate change, we must develop every tool to achieve clean, reliable, affordable and exportable energy. No country will use a single clean power technology—every country will need to find the right mix given its national circumstances, resource endowments and pre-existing industry.

Thank you again for this opportunity, and I look forward to the discussion.

Ms. CASTOR. Thank you very much.

Ms. Monast, you are recognized for 5 minutes.

STATEMENT OF MS. MAGGIE MONAST

Ms. MONAST. Thank you, Chairwoman Castor, Ranking Member Graves, and all the members of this committee, for the opportunity to provide testimony today. I am honored to share with you my perspective on the role of the financial system in supporting climate resilient agriculture.

I am Director of Working Lands for Environmental Defense Fund, an international nonprofit environmental organization. My EDF colleague, Nat Keohane, participated on the CFTC’s Climate-Related Market Risk Subcommittee. So I would also like to thank Commissioner Behnam for his leadership in that process.

At EDF, we are proud to collaborate with farmers, farmer organizations, land grant universities, and businesses throughout the supply chain to ensure a sustainable and profitable future for U.S agriculture. Our farmer advisory board informs all our agriculture

work and was instrumental in shaping my research into the agricultural financial system.

Farmers are on the front lines of climate change. In 2020 alone, we have seen ample evidence of these impacts, including destructive storms in the Midwest, hurricanes along our coasts, and wildfires and smoke in the West. I have personally witnessed the damage while visiting farmers in my home state of North Carolina after multiple hurricanes over the past 5 years. Despite these challenges, agriculture has a tremendous ability to build resilience and be part of climate solutions. However, farmers can't do this alone.

In my research on the financial value and barriers to climate resilient agriculture, it became obvious that the role of agricultural lenders cannot be ignored. Like any business, a farm's success relies on access to finance. Farmers go to agricultural lenders for a variety of lending products, including loans for land, equipment, and operating expenses. Farmer and lender relationships often span many years, and are rooted in a shared community.

Aside from the farmer, him or herself, the agriculture lender has the most holistic view of a farmer's financial health. However, climate risk remains a blind spot for lenders, which creates vulnerabilities for their businesses and for farmer clients. Following severe flooding in the spring of 2019, the Midwest region's agricultural loan portfolio reported the highest level of major or severe repayment problems in 20 years.

As climate talks continue, a credit-stress agricultural lending system could decrease farmers' access to affordable credit and increase their difficulty in recovering from severe weather events. For small farmers and farmers of color, this runs the risk of further worsening historical inequities and access to credit.

While the broader financial sector has made progress in assessing climate risk, agricultural lenders are lagging. The longer the agriculture finance sector waits to assess and address climate risks, the greater the likely severity of economic consequences for lenders and their farmer clients.

In addition to climate risk assessment, we also need financial tools that support farmers in their transition to practices that build resilience. EDF and many others have analyzed farmer budgets showing how climate resilient farming practices, like cover crops, no-till, nutrient management, and diverse crop rotation, can deliver positive returns on investment over the long term in the form of cost reduction, more resilient crop yields, and diversified revenue sources. They also can improve water quality, reduce greenhouse gas emissions, sequester carbon, and support biodiversity.

However, farmers also face short-term barriers to conservation adoption, including costs, risk, and time. Agricultural lenders can create loan products that align with the financial needs of farmers to adopt practices that improve climate resilience. Ultimately, this will benefit both farmers and the overall risk of a lender's portfolio.

So how do we move forward from here? First, we must do better in connecting the data on climate resilient agriculture with the information needed by farmers, lenders, and crop insurers to make decisions and assess risks. Second, we must look carefully at the intersection of farmer equity and climate resilience in agriculture and finance. And, third, we must spur innovation in this area to

further the development of financial products to support farmers in building resilience.

A major shift in the agricultural finance sector’s approach to climate risk and resilience is overdue.

Thank you very much for this opportunity to testify, and I look forward to answering your questions.

[The statement of Ms. Monast follows:]

Testimony of Maggie Monast

Director of Working Lands

Environmental Defense Fund

October 1, 2020

House Select Committee on the Climate Crisis

Thank you, Chairwoman Castor, Ranking Member Graves, and all the Members of this Committee for the opportunity to provide testimony. I am honored to share with you my perspective on the role of the financial system in supporting climate resilient agriculture.

At EDF, we are proud to collaborate with farmers, farmer organizations, land grant universities, and companies throughout the supply chain to advance climate resilient agriculture. Our farmer advisory board informs all our agriculture work and was instrumental in shaping my research into the agricultural financial system.

To start, it’s important to note that, like any business, a farm’s success relies on access to finance. Farmers go to agricultural lenders for a variety of lending products, including real estate loans, equipment loans and operating loans. Farmer and lender relationships often span many years and are rooted in a shared community. Aside from the farmer him- or herself, the agricultural lender has the most holistic view of a farm’s financial health. If our goal is to decrease the risk of financial harm to America’s agriculture sector caused by climate change, the role of agricultural lenders cannot be ignored.

U.S. agriculture is financed by a few different categories of credit providers. The Farm Credit System is a government-sponsored enterprise established to enhance the flow of credit to U.S. agriculture. Farm Credit accounts for 41% of farm debt and is the largest lender for farm real estate.¹ Commercial banks are the other primary category of agricultural lenders, holding slightly more than the Farm Credit System with 42% of total farm debt, and the most farm operating loans.² This segment includes large, diversified banks, financial divisions of major agriculture companies, as well as many regional and community banks. Finally, the Farm Service Agency (FSA), part of the U.S. Department of Agriculture, issues direct loans to farmers who cannot qualify for other sources of credit and guarantees the repayment of loans made by other lenders. FSA represents a small portion of overall farm debt, but it is also a lender of first opportunity because it targets loans or reserves funds for farmers defined as “socially disadvantaged” due to their race, gender and/or ethnicity.³

A proactive approach to managing climate risk includes both climate risk assessment by agricultural lending institutions as well as programs designed to support farmer adoption of resilient practices. There are substantial opportunities for agricultural lenders to support their farmer clients in building climate resilience into their farming operation. At scale, this would also reduce overall climate risk to the agricultural lending sector. It is the combination of these two approaches—assessing and mitigating climate risk at the lending institution level, while supporting agriculture to become more resilient—that will be required to successfully navigate the challenges posed to agriculture and agricultural lending institutions by climate change.

¹ Monke, Jim. (2018, March 26). Agricultural Credit: Institutions and Issues. Congressional Research Service. Retrieved July 2020 from: <https://fas.org/sgp/crs/misc/RS21977.pdf>.

² Ibid.

³ Ibid.

Climate Risk and Agriculture Financial Markets

Farmers are on the front lines of a changing climate. The Fourth National Climate Assessment, a congressionally mandated report by the U.S. Global Change Research Program, describes how increased temperatures, more frequent droughts and extreme precipitation events threaten crop productivity across the United States.⁴ In 2020 alone, we have seen ample evidence of these impacts, including destructive storms in the Midwest, hurricanes along the coast, and wildfires and smoke in the West. I have personally witnessed the damage while visiting farmers in my home state of North Carolina after several hurricanes devastated the Coastal Plain agricultural region in the past five years. In addition to intensifying natural disasters, farmers must also contend with increased variability in temperature and rainfall, as well as changes in natural cycles such as pollination and pest suppression.⁵ These challenges, compounded by poor economic conditions, trade disruptions, and the Covid-19 pandemic have caused the farm economy to experience its worst downturn since 2001.⁶

A recent report from the Commodity Futures Trading Commission (CFTC) Climate-Related Market Risk Subcommittee and my own research at EDF make it clear that climate change poses severe risks to both farmers and the financial system that finances and insures agriculture in the U.S., including agricultural lending and crop insurance. However, there are also opportunities for the agricultural sector to incorporate farming practices that build resilience, reduce risk and provide multiple environmental benefits. This committee underscored those opportunities in its Majority Staff Report, *Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America*. Two building blocks of the report focus on agricultural lending and crop insurance, offering a valuable path forward for Congress on these topics.

The report released last month by the Commodity Futures Trading Commission (CFTC) Climate-Related Market Risk Subcommittee, which included input from my EDF colleague Nat Keohane, deftly links the physical risks of climate change to financial market risks across the U.S. economy. The report has a significant focus on the agriculture sector and describes how climate change poses threats to both farmers and their finance providers, including agricultural lenders. Nearly half of all agricultural loans are held by lenders with at least one-quarter of their portfolio concentrated in farm-related areas, such as operating loans or real estate loans. Many of these lenders also have correlated risks because of loan concentrations in particular geographies or related agricultural businesses. Following severe flooding in the spring of 2019, lenders in the Midwest reported to the Federal Reserve Bank of Chicago that 70% of their borrowers were moderately or severely affected by extreme weather events. That year, the portion of the region's agricultural loan portfolio reported as having "major" or "severe" repayment problems hit the highest level in 20 years.⁷

The CFTC Subcommittee report highlighted the possibility that climate-related risks may well produce "sub-systemic" shocks, which are defined as those that affect financial markets or institutions, or a particular sector, asset class or region, but without threatening the stability of the financial system as a whole. Agriculture, as a sector that is particularly vulnerable to climate change, is at risk of sub-systemic shocks to its financial institutions. A credit-stressed agricultural lending system would decrease farmers' access to affordable credit and increase the difficulty in recovering from climate-related shocks.⁸

Crop insurance is an important shock absorber for farmers and their lenders, but it is not sufficient to protect farmers, lenders or the broader agricultural economy from climate risk over the long-term. The U.S. Department of Agriculture's Economic Research Service estimates that without farmer adaptation to climate change, the cost of the Federal Crop Insurance Program could increase by nearly 40% in the

⁴ USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

⁵ Ibid.

⁶ U.S. Department of Agriculture Economic Research Service. 2020 Farm Sector Income Forecast. (2020, February 05). Retrieved July 2020, from <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/farm-sector-income-forecast/>.

⁷ Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. Commodity Futures Trading Commission. (2020). "Managing Climate Risk in the U.S. Financial System." Retrieved from: <https://www.cftc.gov/PressRoom/PressReleases/8234-20>.

⁸ Ibid.

second half of this century.⁹ The CFTC Subcommittee report notes that a key challenge will be the future capacity of the U.S. government to provide actuarially sound crop insurance, based on best available data, to support changes in underwriting and pricing attributable to climate change and natural variability.¹⁰ In addition, while insurance coverage is currently high for the major field crops and 75% of large farms participate in Federal Crop Insurance, only 15% of all U.S. farms have crop insurance.¹¹ This leaves the majority of U.S. farms and their production left unprotected by crop insurance and vulnerable to weather shocks. This vulnerability can affect the entire value chain, including the lenders that finance it.

There are encouraging signs that the broader financial sector is moving to address climate risk. A 2019 survey of 20 banks and seven other financial institutions found that more than half of major financial institutions now take a strategic approach to climate risk.¹² However, research and interviews I conducted with agricultural lending institutions indicate that the U.S. agricultural lending sector currently lags in assessing climate risk and incorporating it into risk mitigation strategies—as evidenced by lenders citing their largest risks as commodity prices, production costs, farmland values and global market issues.¹³ Most agricultural lenders do not specifically assess climate risk. The longer the agricultural lending sector waits to assess and address climate risks, the greater the likely severity of economic consequences—for lenders, for farmers and for all Americans who rely on our nation’s farmers to put food on the table.

The CFTC Subcommittee report makes several recommendations that would represent substantial steps forward in assessing climate risk to agriculture and its financial institutions. These include recommending that the research arms of federal financial regulators undertake research on the financial implications of climate-related risks, including the potential for and implications of climate-related “sub-systemic” shocks in the agriculture sector. The report also recommends that relevant federal regulators assess the exposure to and implications of climate-related risks for the portfolios and balance sheets of the government-sponsored enterprises (GSEs), such as Farm Credit, and strongly encourage the GSEs to adopt and implement strategies to monitor and manage those risks. Another key recommendation is for regulators to work with financial institutions, including agricultural and community banks, to pilot climate risk stress testing that will enable stakeholders to better understand institutions’ exposure to climate-related physical and transition risks, as well as to explore climate-related financing opportunities.¹⁴

The CEO of CoBank, which is part of the Farm Credit System, recently wrote that “Concerns about climate change are now a permanent part of the operating environment for rural America.”¹⁵ Agricultural lenders are critical financial institutions in a sector that is already experiencing substantial climate impacts. That fact should be reflected in risk assessment and management in order to prepare for and mitigate financial impacts to lenders and their farmer borrowers.

Opportunities to Finance Resilient Agriculture

Two approaches are required to successfully navigate the challenges posed to agriculture and agricultural lending institutions by climate change: assessing and mitigating climate risk at the lending institution level and supporting agriculture to become more resilient. EDF published a report in September 2020 that addresses both topics, titled *Financing Resilient Agriculture: How agricultural lenders can reduce*

⁹ Crane-Droesch, Andrew et al. (2019, July). Climate change and agricultural risk management into the 21st century. U.S. Department of Agriculture Economic Research Service. Retrieved from: <https://www.ers.usda.gov/webdocs/publications/93547/err-266.pdf?v=9932.1>.

¹⁰ Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. Commodity Futures Trading Commission. (2020).

¹¹ U.S. Department of Agriculture Economic Research Service. (2017, December). America’s Diverse Family Farms. Retrieved from: <https://www.ers.usda.gov/webdocs/publications/86198/eib-185.pdf>.

¹² GARP Risk Institute. (2019). Climate Risk Management At Financial Firms: A good start, but more work to do. Results from a global survey. Retrieved from: https://www.garp.org/newmedia/gri/climate-risk-management-survey/AGoodStart_052919_PDF.pdf.

¹³ Board of Governors of the Federal Reserve System. (2011, October 26). SR 11–14: Supervisory Expectations for Risk Management of Agricultural Credit Risk <https://www.federalreserve.gov/supervisionreg/srletters/sr1114.htm>.

¹⁴ Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. Commodity Futures Trading Commission. (2020).

¹⁵ CoBank. (2019). Rural Industries and Climate Change. Retrieved from: <https://www.cobank.com/-/media/files/ked/general/rural-industries-climate-change.pdf?la=en&hash=234B62A18E2E279D82C84222C1E62DB343E9F816>.

*climate risk and help farmers build resilience.*¹⁶ The report was informed by extensive interviews with agricultural lenders and other experts, and included major contributions from the AGree Economic and Environmental Risk Coalition, agricultural accounting and consulting firm KCoe Isom, The Nature Conservancy and Scott Marlow of Long Rows Consulting.

While agriculture faces major risks from climate change, it also has the capacity to adapt and build resilience to protect long-term productivity and profitability. Many well-known conservation practices that improve soil health, such as no-till, cover crops and diverse rotations, can build resilience. Healthy soils increase the sponginess of the soil, allowing it to absorb water during wet periods and retain it during dry periods, improving field trafficability and improving the resilience of crop yields.¹⁷ Along with edge-of-field practices such as buffers and wetlands, agriculture can also contribute to resilience at the watershed scale by holding excess water and reducing the magnitude of flooding.¹⁸ The practices that build soil health also have the potential to generate multiple environmental benefits, including reduced erosion, improved water quality, reduced water use, improved biodiversity, and reduced greenhouse gas emissions and improved carbon sequestration.^{19, 20, 21, 22, 23}

EDF and many other organizations and universities are collaborating with farmers to quantify the financial value of these practices. These analyses show that resilient farm management practices support risk reduction and farm financial viability by stabilizing crop yields, lowering costs of production, diversifying revenue streams and preserving the long-term value of the land. Examples include:

- Practices that improve soil health can allow farmers to reduce input costs over time, as biological processes are able to replace some synthetic nutrients, herbicides and pesticides.²⁴
- No-till has well-documented cost savings in fuel, labor, and equipment due to fewer passes over fields and the ability to invest in less machinery or machinery with lower horsepower.²⁵
- Diverse crop rotations and the integration of livestock diversify farm revenue sources and protect farmers from both price and yield swings.²⁶
- Grain farmers who used cover crops for five consecutive years experienced a 3% increase in their corn yield and a 5% increase in soybean yield. In the drought year of 2012, farmers reported even greater yield increases when they used cover crops: nearly 10% in corn and 12% in soybeans.²⁷

Despite these benefits, farmers still must overcome multiple obstacles to adoption. Short-term costs and risks during the transition period may be a deterrent, espe-

¹⁶ Monast, Maggie. (2020, September). Financing Resilient Agriculture: How agricultural lenders can reduce climate risk and help farmers build resilience. Retrieved from: <https://edf.org/aglending>.

¹⁷ Basche, A.D. and M.S. DeLonge. 2019. Comparing infiltration rates in soils managed with conventional and alternative farming methods: A meta-analysis. PLOS ONE 14(9):e0215702. doi:10.1371/journal.pone.0215702.

¹⁸ Walters, K.M., Babbar-Sebens, M. (2016). Using climate change scenarios to evaluate future effectiveness of potential wetlands in mitigating high flows in a Midwestern U.S. watershed. *Ecological Engineering*. pg 80–102. doi: <http://dx.doi.org/10.1016/j.ecoleng.2016.01.014>.

¹⁹ Hunt, N.D., J.D. Hill and M. Liebman. 2019. Cropping System Diversity Effects on Nutrient Discharge, Soil Erosion, and Agronomic Performance. *Environmental Science & Technology* 53(3):1344–1352. doi: 10.1021/acs.est.8b02193.

²⁰ Mhazo, N., P. Chivenge and V. Chaplot. 2016. Tillage impact on soil erosion by water: Discrepancies due to climate and soil characteristics. *Agriculture, Ecosystems & Environment* 230:231–241. doi: <https://doi.org/10.1016/j.agee.2016.04.033>.

²¹ Morton, L.W., J. Hobbs, J.G. Arbuckle and A. Loy. 2015. Upper Midwest Climate Variations: Farmer Responses to Excess Water Risks. *Journal of Environmental Quality* 44(3):810–822. doi: 10.2134/jeq2014.08.0352.

²² Eagle, A.J. and L.P. Olander. 2012. Greenhouse gas mitigation with agricultural land management activities in the United States—A side-by-side comparison of biophysical potential. *Advances in Agronomy* 115:79–179.

²³ Kim, N., Zabaloy, M.C., Guan, K., & Villamil, M.B. (2020). Do cover crops benefit soil microbiome? A meta-analysis of current research. *Soil Biology and Biochemistry*, 142, 107701.

²⁴ Rob Myers, Alan Weber, and Sami Tellatin. (2019). Cover Crop Economics: Opportunities to Improve Your Bottom Line in Row Crops. Sustainable Agriculture Research & Education. Retrieved from: <https://www.sare.org/Learning-Center/Bulletins/Cover-Crop-Economics>.

²⁵ Monast, Maggie and KCoe Isom AgKnowledge. (2018). Farm Finance and Conservation: How stewardship generates value for farmers, lenders, insurers and landowners. Retrieved from: <https://edf.org/farm-finance>.

²⁶ Roesch-McNally, Gabrielle, Arbuckle, J., and Tyndall, John. “Barriers to implementing climate resilient agricultural strategies: The case of crop diversification in the U.S. Corn Belt.” *Global Environmental Change* 48 (2018) 206–215.

²⁷ Rob Myers, Alan Weber, and Sami Tellatin. (2019).

cially in economically challenging times.²⁸ Common lending practices also create disincentives. Lenders often lack information on the farm budget impacts of conservation practices and may not be able to assist borrowers in projecting their returns. Lenders also typically focus on the short-term repayment of the operating loan, which can come at the detriment of long-term profitability and financial stability. Finally, loan terms often do not align with the transition period needed to adopt conservation practices or accord value to them. This disconnect between credit requirements and lender practices and the financial transition to farming practices that build resilience can prevent farmers from adopting new conservation practices.

The agricultural lenders interviewed for the *Financing Resilient Agriculture* report expressed a strong interest in improving their understanding of the farm budget impacts of conservation practices. Such information can be translated to lender decision-making, lending programs and products that better serve farmers who adopt, or want to adopt, practices that build resilience. While lenders cannot require their clients to adopt specific practices, there are several existing examples of lender programs or products that support farmers in navigating similar financial barriers or transitions. For example, the Farm Credit system has a longstanding history of supporting lending programs for young, beginning and small farmers, which often include credit enhancements and business counseling to help farmers grow their operations.²⁹ In addition, Rabobank AgriFinance and Compeer Financial recently launched organic transition loans that help bridge the gap between a farmer beginning organic practices and when the farm achieves organic certification and receives a market premium.^{30,31} These examples show how lenders can develop new or modified loan programs or products that can help farmers navigate transitions to different farm management systems. Agricultural lenders could approach farmer transitions to more resilient farming practices in the same way.

New lending programs that finance resilient agriculture will realign lending structures to better match the needs of farmers who adopt practices that improve resilience. Ultimately, this will benefit both the farmer and the overall risk of a lender's portfolio. Where initial programs and products do not meet current credit standards, loan support from partners (e.g. USDA, foundations, food companies, or impact investors) can help bridge the gap. The public sector is well positioned to de-risk initial programs or collect the data needed to allow loans for resilient agricultural practices to stand on their own. Ultimately, the objective is to accurately reflect the value of resilient agriculture in credit pricing and structures.

Equity Considerations in Financing Resilient Agriculture

The U.S. Department of Agriculture (USDA) defines socially disadvantaged farmers and ranchers (SDFRs) as members of certain racial and ethnic minority groups and women. A study of agricultural credit services provided to SDFRs conducted by the Government Accountability Office in 2019 found that they represented an average of 17% of primary producers in the survey, but they accounted for only 8% of total agricultural debt.³² This demonstrates the challenges that farmers of color and women farmers face that restrict their ability to obtain private agricultural credit. According to the GAO report, they are more likely to operate smaller, lower-revenue farms; have weaker credit histories; or lack clear title to their agricultural land, which can make it difficult for them to qualify for loans. Farmers of color and advocacy groups also report unfair treatment and discrimination in lending.³³

There is a critical intersection between considerations of equity and resilience in agriculture and agricultural credit. Due to the history of discrimination in access to

²⁸ Monast, Maggie and KCoe Isom AgKnowledge. (2018).

²⁹ Pellett, Nancy. (2007, August 10). Revised Bookletter 040—Providing Sound and Constructive Credit to Young, Beginning, and Small Farmers, Ranchers, and Producers or Harvesters of Aquatic Products. Retrieved from: https://www3.fca.gov/readingrm/Handbook/_layouts/15/WopiFrame.aspx?sourcedoc={788991C0-7E8B-43AC-ADB4-55C500B85A94}&file=BL-040%20REVISED.docx&action=default.

³⁰ Rabo AgriFinance. (2019, October 24). "Rabo AgriFinance Designs Industry's First Organic Transition Loan Offering." Retrieved from: <https://www.raboag.com/news/rabo-agrifinance-designs-industrys-first-organic-transition-loan-offering-54>.

³¹ Compeer Financial. (2020, February). New Organic Bridge Loan. Retrieved from: <https://www.compeer.com/Utility/Support/About/Newsroom/Press-Releases/February-2020/New-Organic-Bridge-Loan>.

³² U.S. Government Accountability Office. (July 2019). Agricultural Lending: Information on Credit and Outreach to Socially Disadvantaged Farmers and Ranchers is Limited. Retrieved July 2020 from <https://www.gao.gov/assets/710/700218.pdf>.

³³ *Ibid.*

credit, risk management and other services,³⁴ the economic impacts of climate change on agriculture are likely to fall disproportionately on farmers of color and small farmers. There are many opportunities to improve both the resilience and equity of agriculture through inclusion of the expertise of organizations led by farmers of color, women farmers and small farmers. Strengthening support for farmers of color, women farmers and small farmers within the agriculture sector can establish paths toward long-term prosperity while helping to secure the future of resilient food systems.³⁵

The Path Forward

Given the increasing severity and frequency of weather events projected to continue affecting farmers across the country, a major shift in the agricultural lending sector's approach to climate risk and resilience is overdue. As farmers' closest financial partners, agricultural lenders have a critical role to play in supporting climate-resilient agriculture. This role is highlighted in the House Select Committee on the Climate Crisis' Majority Staff Report, *Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America* through the building block to "Provide Lending, Credit, and Land Valuation Incentives for Improving and Maintaining Soil Health and Carbon Sequestration."³⁶

We agree with the report's recommendation for Congress to incentivize data collection to demonstrate the reduced risk and profitability benefits of conservation practices. While many studies analyze farmer budgets and other relevant data sources, there is a critical need to expand such analysis and connect it to the type of information required by agricultural lenders and crop insurers for decision-making and risk analysis. An important caution in this area is to avoid relying entirely on data sources that exclude small farmers or farmers of color. For example, farm management software is much more commonly available to and used by large-scale farmers; small farmers and farmers of color are not as likely to utilize this technology.³⁷

The path forward to demonstrate the reduced risk and profitability benefits of resilient agriculture will require methods to assess the financial performance and resilience of farms of all types and sizes, and an openness to learn from a variety of different operations. This will also require clear protections for all farmers in terms of how their data will be used and secured. Opportunities to support and simplify farm recordkeeping for farms of all sizes would help overall farm management as well as the assessment of farming practices that build resilience.

This committee's recommendations related to the Federal Crop Insurance Program are also noteworthy. Crop insurance is a trusted risk management tool used by many farmers; it is also complex and potential changes require careful consideration. Congress has the opportunity to work cooperatively with farmers, the U.S. Department of Agriculture's Risk Management Agency, and the crop insurance industry to systematically assess how climate change is likely to impact farmers and how crop insurance can mitigate those risks by incentivizing resilience in agriculture.

Thank you again for the opportunity to testify today and to address this important issue. Farmers are already experiencing the impacts of climate change, and these risks flow through to the financial system that finances and insures agriculture. To address these risks, greater efforts must be made both in climate risk assessment and in fostering resilient agricultural practices and production systems. Agriculture financial institutions have a critical role to play in supporting this transition, one that will ultimately benefit farmers, the financial system, and the U.S. economy. EDF looks forward to continuing to work with you on efforts to build resilience in agriculture.

Ms. CASTOR. Thank you very much.

³⁴ Tyler, Shakara S. and Moore, Eddie A. (2013). "Plight of Black Farmers in the Context of USDA Farm Loan Programs: A Research Agenda for the Future," *Professional Agricultural Workers Journal*: Vol. 1: No. 1, 6. Available at: <http://tupubs.tuskegee.edu/pawj/vol1/iss1/6>.

³⁵ Union of Concerned Scientists and HEAL Food Alliance. (2020). *Leveling the Fields: Creating Farming Opportunities for Black People, Indigenous People, and Other People of Color*. Retrieved July 2020 from: <https://www.ucsusa.org/sites/default/files/2020-06/leveling-the-fields.pdf>.

³⁶ House Select Committee on the Climate Crisis. (2020, June). *Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America*. Page 340. Retrieved from: <https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf>.

³⁷ McDonald, J., Korb, P., Hoppe, R. (2013, August). *Farm Size and the Organization of U.S. Crop Farming*. U.S. Department of Agriculture Economic Research Service. Retrieved from: https://www.ers.usda.gov/webdocs/publications/45108/39359_err152.pdf.

Now, we will go to members for questions. I will recognize myself for the first 5 minutes.

Dr. Syroka, you testified that the World Bank has been helping countries use catastrophe bonds to manage their disaster risks for more than 10 years. I think I saw something like this in action in Florida following a devastating hurricane season where they developed a backstop catastrophe fund.

What steps should Congress take to ensure that cat bonds and other innovative solutions are available as an option to help U.S. communities, especially those that are vulnerable to climate risks? And if you could also address the fact, we don't want these to be used to incentivize intense development in risky areas either. So what is your view?

Dr. SYROKA. Thank you, Madam Chair. Indeed, these instruments are being used around the world, in emerging economies in particular, to help economies and communities rebound after disasters. The World Bank has been instrumental in helping countries tap our market.

My testimony has several recommendations for Congress to consider to be—to enable the same kind of innovation that we have seen abroad to happen here in the United States in public-private partnerships that can—as you—to your point, help communities deal with the risks they face.

One of the first recommendations we have would be to ease—lower the barriers of access to this market for communities and other public entities that would like to tap the market but find it operationally difficult or resource prohibitive to go offshore to enter into such transactions. And in fact, even discuss such transactions. That is an impediment, we believe, to more innovation in this space here in the United States.

The other recommendation we have is, of course, it is why I have been talking about the financing parts of these things, a lot of expertise and technical assistance is required for communities, municipalities, utilities, transportation providers, entities that want to tap this market space to create programs that they would like to finance using these funds.

There were some great recommendations on technical assistance that the Federal Government could consider giving in the staff majority report of the Select Committee, which could go a long way to help communities understand how they can leverage the technologies available there to manage the risks they face. And anything that Congress can do to help Federal agencies in particular identify, and then quantify, and then consider working with the private sector to manage their risks could go a long way of encouraging this process to begin.

You did have a question about incentivizing. Obviously, I mentioned in my testimony that our market helps to put a price on weather risk and, therefore, on—consequently, on climate risk. The way that works at the highest level is, of course, imagine a community development or property or infrastructure that is well managed; all things being equal, a property that is poorly managed shouldn't receive as competitively priced insurance range. For instance, an ILS is the best management property simply because when a disaster strikes, they will experience bigger losses. That is

invested in the space. When we look at security, these are things we consider in our underwriting and investment process, and that is how that pricing signal is transmitted.

Ms. CASTOR. So for local communities, that means building standards, building codes, land use policies?

Dr. SYROKA. Absolutely it would be.

Ms. CASTOR. Okay.

Dr. SYROKA. And we—that would begin to establish that feedback loop. That is precisely to your point, Madam Chair, establishes incentives for better risk management in the long run. Having that price of risk allows communities, for example, to make more optimal decisions on how the various options they have, mitigation, do nothing, ensure the options they have before them, they can make optimal decisions on how they allocate their limited resources to deal with the problem.

Ms. CASTOR. Thank you very much.

Ms. Monast, you have testified about the importance of adopting conservation practices that improve soil health and build resilience, and similar to our solving the climate crisis, the majority staff report. But EDF has recent reports that also identifies barriers to financing resilient agriculture. What else should Congress be aware of here as we move forward?

Ms. MONAST. I think two things that Congress should be aware of, one was noted in your report, the opportunity for data collection and coordination to link practices that build climate resilience with farm profitability. That would be really important for the decision-making of farmers, lenders, and insurers. And the other policies to spur innovation, to spur new products or programs that can help farmers get through the transition to more resilient practices.

Ms. CASTOR. Great. Thank you very much. We are going to work more on this together.

Ranking Member Graves, you are recognized for 5 minutes.

Oh, I guess he is not here.

Okay. We will go to Rep. Bonamici, you are recognized for 5 minutes.

Ms. BONAMICI. Thank you, Chair Castor. And thank you all for your testimony.

Last summer, I had a chance to visit a place called 46 North Farm. It is in beautiful classic county in the Pacific Northwest outside of Astoria, Oregon. So the farmers there don't irrigate their crops. Even during the dry season, they work to conserve soil moisture through a variety of management strategies, like the use of cover crops that help them access water and nutrients in the soil later in the growing season. So dry farming practices. They have allowed 46 North to restore a significant portion of the land which was previously heavily degraded. This is a pretty successful model that could and should be scaled up across the country.

But, Ms. Monast, following up on the chairwoman's question, in your testimony, you noted that common lending practices can create disincentives for adopting resilient agricultural practices like no-till, cover crops, and diverse rotation. So can you talk a little bit about what those disincentives are, and how Congress can decrease the financial risk for adopting climate smart agricultural practices?

Ms. MONAST. Yes. Thank you, Congresswoman. So some of the disincentives and common lending practices are, one, just lenders not having information on the financial attributes of the types of farms that you mention, which often differ from conventional farmland. Two is other short-term focus often, especially with yearly operating loans that are used with many farms, both by repayment and on long-term profitability and resilience. And another is that loan terms often don't align with that financial transition to help the farmer through.

As for what Congress can do, I would, you know, point back to my previous answer about helping with the data, first of all. And, second, focusing on spurring innovation and helping to foster those types of products that could better assist the kinds of farms that you mention.

Ms. BONAMICI. Great. Thank you so much.

Moving on to Dr. Syroka. I hope I am pronouncing your name correctly. Could you talk about how innovative finance practices could support rapid and resilient recovery from natural disasters? For example, the wildfires that we are seeing currently in Oregon and across the West today. How could innovative finance practices help with the recovery, Dr. Syroka?

Dr. SYROKA. Thanks for the question. And first off, obviously, there are communities today that are suffering throughout this country because of wildfires, the hurricanes that hit. I pretty much am aware that my testimony today can't do anything to help those families that are already suffering, and our condolences go to them. I talk about catastrophe risk in my testimony, but it is a catastrophe when anyone loses a house or a business. But, hopefully, some of the recommendations we have can help future disasters as they affect communities not have the big economic consequences that we are seeing today.

I think most people agree that traditional disaster relief approaches are not as timely and equitable as they could be. And often in this situation, the most weakest link in the chain, the most vulnerable communities are the ones left dealing with the risk alone while resources are mobilized to help them. And we know that can take days, weeks, months. And in that time, suboptimal decisions are made that can impact an individual, a family, a business for a long time in terms of their economic advancement and productivity.

Obviously, if communities knew that if Y happens, they will get X and they will do Z, as you say here in America, then there is a lot more information that they can rely on to make better decisions in the face of crisis. That takes many elements, and one of those is force contingency financing, like the tools that I mentioned in my testimony. So when a disaster strikes, you know the financing is there to help to implement your Y and your Z. And that is another critical point though, you do need the Y and the Z to really unlock the promise that insurance and timely and reliable financing can give you.

So as I mention in my testimony, disaster—broader disaster risk management plans where these tools are embedded in them to make sure the financing flows in a timely fashion can potentially unlock more desired effects in terms of helping communities re-

bound. If there are plans in place to minimize economic negative consequences and even better—build back better, and more resiliently to protect communities and the economy from future disasters.

So we have a role to play in facilitating those disaster resiliency plans.

Ms. BONAMICI. Thank you so much. And we have a community out in Oregon, for example, on the coast that took close to a decade to be able to come up with the funding to move their schools out of a tsunami inundation zone. And when you think about how risky that could have been had there been an earthquake, a nearshore tsunami, it would have been disastrous. So there is a lot that we can attribute to it. Thank you, Doctor.

I yield back the balance of my time.

Ms. CASTOR. Perfect.

Rep. Levin, you are recognized for 5 minutes.

Mr. LEVIN. Thank you, Chair Castor. I appreciate it very much.

Ms. MONAST, I wanted to follow up, I am very interested in regenerative agriculture. In fact, I saw a movie, a new movie on Netflix about it, which even had some scenes filmed in my district. So I wanted to ask you about it.

Clearly, an important piece of mitigating the climate crisis, reducing emissions, sequestering more carbon, and increasing biodiversity. And in your testimony, you mentioned practices associated with it, such as no-till, cover crops, diverse rotations, as we have discussed, to build resilience and improve soil health.

So if my colleagues across the aisle were here—I don't think any of them are. I think we see Mr. Graves' white board, but I don't think he is actually there. But if they were here, what would you want to tell them about regenerative agriculture and, specifically, what role it would have in making farms more resilient to the financial risks associated with the climate crisis?

Ms. MONAST. I haven't seen that movie, but my mom thought it was fantastic.

So I think the benefit of this work in agriculture is it really is bipartisan and appeals to all sides. These practices have multiple benefits, both to the environment and also financially for farmers. We have a 20-farmer advisory board—bipartisan—that advises us on our work. And they really have seen that once you get through this initial transition period, there are multiple benefits to their soil and to their finances. So I think that is the most important thing to focus on, and then the enabling environment to allow more farmers to build their resilience.

Mr. LEVIN. Thank you for that. I highly recommend everybody see the movie.

Ms. Syroka, I wanted to ask you, in your fourth recommendation to the committee you say, quote, "Congress should consider legislation to encourage Federal agencies to work with the private sector to better manage and transfer climate risk," end quote. And as I mentioned during our first panel, Representative Casten has a great bill to require public companies to disclose how they will be impacted by the climate crisis and hopefully creating an environment of transparency for investors.

Disclosure is absolutely essential to ensuring investors and companies make informed decisions on those investments. However, in your recommendation, you specifically mention management and transfer of climate risk.

Ms. Syroka, what policies would you recommend to help companies manage and transfer this risk?

Dr. SYROKA. Thank you, Congressman. I mean, the first step in managing any risk is to identify it and to quantify it. And we have had much discussion earlier on today about policies that can help companies do that. But also I believe these are steps that should be done within Federal agencies and government agencies too. Many—actually, there was some great recommendations in the staff—Select Committee’s majority staff report on encouraging entities, states, and municipalities, communities to look at innovative risk transfer to seek or to provide technical assistance to these entities so they can quantify and identify their risks. There were also other recommendations to do risk data availability.

Those are all the critical steps that are required for companies to—for companies to entities to be able to understand their risks and then make the optimal decisions in how they should be managed. And risk transfer is one of those options, but there could also be decisions to mitigate or to manage the risk as it is to the extent it cannot be mitigated or transferred.

So I think all the recommendations have been—many of those key recommendations have already been made in the staff majority’s report that I had the pleasure of reading before this testimony.

Mr. LEVIN. Terrific.

I want to thank you both for taking the time to speak with us. And thanks to all three of you for all the good work that you are doing.

And I yield back.

Ms. CASTOR. Okay. Are there any Republican members here on standby?

All right. If not, then, we will go to Rep. Casten, you are recognized for 5 minutes.

Mr. CASTEN. Thank you, Madam Chair. Thanks to our witnesses.

Ms. Syroka, in your written testimony, you made reference—and I don’t have it right in front of me, so I hope that I am getting this right—that there are financial products that could allow insurers to hedge risk and then pass that risk that insures the hedge risk, and then pass that along to the global bond market. Is there a concern that could create some other systemic risks either to those bond holders or to, you know, borrowers that have completely unrelated lines of debt but are drawing on similar liquidity pools?

Dr. SYROKA. That is a great question, and I understand the concerns that you may have, given the global financial crisis and previous shocks to the financial system. I would say the bonds that you are referring to, Congressman, are insurance-linked securities. My company is an insurance-linked securities manager. These bonds are fully funded, i.e., the money required to—the maximum these bonds could possibly default has already placed its collateral against the risks they are underwriting.

Investors around the world usually invest through specialized agencies, managers like us. And our job is to try and identify the

risks to these securities, which are very specific catastrophe risks. Often, as I mentioned in my testimony, insurance industry loss events that stress balance sheets the most. And our job is to make sure our investors are adequately rewarded for setting capital against those risks.

I think we can all agree, I think many people understand there is a lot of capital in the world seeking a productive home, and our market is providing a real economic function by supporting the insurance markets here in the United States. That is why insurers are tapping our markets, as are reinsurers, those are companies that insure insurance companies, because they see risks increasing, yet they want to continue to provide coverage.

And our markets and these bonds that we discussed essentially allow them to transfer risks from their balance sheets, the ones that provided the most concentrated risks from the balance sheets so that we can continue writing coverage to those areas that need it most. But I should say—[inaudible] fully collateralized and not subject to similar blowup risks you may experience in other markets.

Mr. CASTEN. Well, I am delighted to hear about the collateralization. When we have had some folks in the insurance sector before us in the past sessions, what several of them have noted is that, for the most part, their policies don't extend much beyond a year or two. So where does that risk reside in the financial system?

You know, if I am insuring a 30-year mortgage on a coastal property, I know I am going to rewrite the policy every year. Within the financial sector, where does that risk sit?

Dr. SYROKA. It currently sits with the investors in the mortgages. You know, you are right, insurance companies reprice every year, in general. They won't have to reprice, though. Insurance is a permanent feature of our economy. But those prices may well move.

Our role as a market is to provide—to relieve the pressure from the insurance system of these increasing risks because they are creating protection gaps and gaps in coverage. And they are the ones particular that stress those balance sheets the most. So, yes, our market is fully collateralized, and in fact, many of the securities in our markets are more than 1 year; they can be 3 years, up to 5 years, so in terms of locking capacity.

Mr. CASTEN. If I could—and I am sorry for being quick, but I know we are tight on time. My concern is that we have got these risks that are going exponential and the holders, our brains, tend to think linearly too often.

Dr. SYROKA. Absolutely. And that is why we need to consider a new type of finance to deal with these exponentially growing risks, and that is tapping into the deeper pockets of the capital markets that can manage those risks more effectively than rated and regulated balance sheets.

Mr. CASTEN. So I have introduced the Climate Change Financial Risk Act with Senator Schatz that is specifically to direct the Fed to essentially recognize climate as a systemic risk. Because I was concerned that there is a—in spite of the good work you are doing, there is a gap in markets that time-dating, and it is going to end

up being held ultimately by the equity, I suppose, which gets wiped out.

I have more questions, but with 30 seconds left, I think I am out of time, so I will yield back, Madam Chair, rather than trying to rush something through. Thank you.

Ms. CASTOR. All right. Rep. Huffman, you are recognized for 5 minutes.

Mr. HUFFMAN. Thank you, Madam Chair.

Mr. Powell, thanks for your testimony. I want to thank you first for acknowledging that the climate threat is real and that we need to address it. And I also appreciate your suggestion that we need to address it in a way that keeps us globally competitive and doesn't cede influence and leverage to some of our geopolitical rivals around the world.

I think the only thing you and I might disagree with in that conversation is that I am guessing you may believe that some fossil fuel technologies would qualify as clean energy as we try to outcompete our global rivals in that effort, and I don't think so. But we can talk a little more about that.

I am interested in exploring this trope that we hear a lot, unfortunately, from some of our colleagues across the aisle. Yesterday, for example, in the Natural Resources Committee, Congressman Levin had a bill to simply take away some of the sweetheart terms that for decades would give the oil and gas and coal companies on public lands that give them—make them pay a fraction of what they would pay for leases and royalty payments on private land or on State land. Simply taking away some of these subsidies.

And whenever we talk about doing something the fossil fuel industry doesn't like, we hear this trope that, oh, we are going to lose our energy independence and we will have to go on bended knee to Putin and the Saudis. Never mind the irony that our president is already on bended knee to Putin and the Saudis, but the answer to that is more likely in his tax returns than in our energy policy.

But back to what actually creates influence for regimes like Russia. Wouldn't it be devastating to Russia's global influence if we were to lead the world toward clean energy and dramatically reduce dependence on the one thing Russia has, fossil fuel?

Mr. POWELL. Well, first, thank you for the question, Congressman. Thank you as well for your leadership on these issues, including a sponsorship of the SEDA Act and the ARPA-E Renewal bill, very important innovation legislation. So thank you for all that.

Just quickly on the point about fossil fuels. I do think it is more productive to keep the conversation focused on emissions rather than on the fuels. So if we can advance the technology in a way that removes the emissions for our fuel sources, why wouldn't we continue to use the technology, if, if it is—

Mr. HUFFMAN. Okay. Let's come back to that. Let's come back to that because I do have a follow-up about that.

Mr. POWELL. So—and then on your point, sir, so absolutely, we need to be focused on developing everything we can that can combat Russian and Chinese influence around the world. Both countries are using their energy exports very effectively as tools of strategic diplomacy. You know, Russia, as you know, through the

Gazprom system, attempts to build influence in Europe to its very leaky gas pipeline system, right—

Mr. HUFFMAN. Right.

Mr. POWELL [continuing]. Which is much, much—so, you know. U.S. LNG exports, for example, into Southern Europe, even with all of the energy penalties of the LNG, still have 40 percent lower life cycle emissions than pipe gas into Western Europe through the Gazprom system. So we can combat that through today's technology with LNG. We can combat that through tomorrow's technology with LNG combined with CCS power plants, or with hydrogen and ammonia production. And, of course, we can also combat that with, you know, advanced storage technology or advanced nuclear technology.

Russia, of course, also has significant, probably global and leading nuclear exports. That is kind of their virtual pipeline network around the world—or around the world in how they exert influence. And that is another area where we need to push it back.

Mr. HUFFMAN. Okay. All right. Well, thank you for that.

So here is the disconnect that I don't quite understand. If this is about preventing countries around the world from getting hooked on the fuels that some of our geopolitical rivals would continue to sell them, why would we not want every country around the world to go solar and wind and geothermal and embrace the technologies that, first of all, are cheaper than these fossil technologies these days, but, second, they won't have to be dependent on any other country? Once that technology is in place, they are not going to be under anyone's thumb. Why wouldn't that be devastating to Russia and to China?

Mr. POWELL. Well, it certainly would be devastating to Russia and China if we were to remove their influence from the energy markets. Here is the reality, though, today. We have to look at the cost of the energy systems that these countries are building. And so while the production costs of wind and solar, and in some sense, geothermal and hydropower today can be quite low, the system costs of building a whole system that produces that technology—produces energy from that technology 24/7, 365 are actually not quite competitive today with a system relying purely on subcritical coal.

So, for example, Pakistan right now, extremely cost-sensitive, is building a system that is mostly subcritical coal, and some wind and solar on top of it. Which is probably for them, they don't really care about—well, they are at a point in their development trajectory where they are not prioritizing low-emission energy. For them, it is the lowest cost system that they can put in place. And that is what we need to change.

Mr. HUFFMAN. Right.

Mr. POWELL. We need to have the technology, a flexible technology which can replace that subcritical coal power that is providing a baseload of flexibility. And perhaps that is a grid-scale solar system, perhaps that is a hydrogen power plant that uses renewable energy, perhaps that is a hydrogen power plant that uses nuclear to produce the clean hydrogen. So there are all kinds of options we should be pursuing.

Mr. HUFFMAN. I appreciate the conversation.

And I yield back.

Mr. POWELL. Thank you.

Ms. CASTOR. Sure thing.

All right. Congresswoman Brownley, you are recognized for 5 minutes.

Ms. BROWNLEY. Thank you, Madam Chair. And for some reason I can't find the clock on my screen, so I will try not to exceed my time.

But, Ms. Monast, I wanted to thank you first for being here. And I also want to thank you for your help in my office where you have been helping us put together a bill that would initiate a study into the unique challenges faced by farmers who lease or rent lands in terms of being able to participate in conservation practices.

Could you just share a little bit about some of those challenges, you know, for our farmers who are wanting to do the right thing but are renting or leasing land?

Ms. MONAST. Yes, Congresswoman. And thank you also for your collaboration and for your staff's great interest in this topic.

So a high percentage of farmland in the U.S. is rented. I think it hovers around 50 percent nationally, but it varies depending on where you are, and it can be as high as 70 percent in some states. And if you think about it, that kind of splits the incentives that we are talking about, because if we are talking about building back the soils, managing the long-term value of the land, that sits with the landowner, but the person who does the farming is the farm operator. And they are often the person who incurs the cost, especially if they are on an annual cash rent lease.

So what I hope we are able to explore in collaborating with your office is figuring out how to rejoin those incentives so that the landowners' interest is better matched with the farmers.

Ms. BROWNLEY. What does a typical lease look like for a farmer in terms of longevity in land?

Ms. MONAST. Well, leases can be structured in any number of ways, but the predominant formula that I am aware of is annual cash rent. Which, you know, it is because it is simple and easy, but that also means that the farm operator essentially doesn't have a stake in the long-term value of the land.

Ms. BROWNLEY. Right, right, right. I just, that is surprising to me, actually, that if you think of, you know, roughly 50 percent and they are on annual lease—anyway, I appreciate that.

I wanted to ask Ms. Syroka a question also. This is—what you do is all relatively new to me, but I was just actually curious to know that it sounds like the ILS market is, you know, has emerged over the last 30 years. It sounds like you see it as something that is—can grow exponentially towards in the future. But does there come a point where there are—these kinds of securities are—get to a place where they are no longer attractive to investors because disasters are just happening, you know, one on top of another and happening regularly? It sounded like you just said earlier that the more disasters, the better the market. But can you hit a point of no return, I guess, is the question?

Dr. SYROKA. That is a great question. I believe we are a long way from that point of no return. And let me explain. The reason—the primary reason why investors are attracted to our asset class, obvi-

ously I mentioned the ESG elements of it in my testimony, but, fundamentally, our asset class brings very important diversification to their portfolios. Investors already highly expose the equity markets to the bond markets. They are always seeking alternative investments that can bring them some kind of diversity—diversification, and even better, in the long run, of course, expected return.

So far, our market is about 0.1 percent approximately of the global bond markets. It is nearly a hundred billion dollars in size. It can grow. It can grow quite a long way before it—the issues you discussed become material for our investors.

Obviously, I had mentioned in my testimony how the pricing can provide a very important signal to those bringing risk to the markets in terms how much that cost—that risk costs. And our job as an investment manager is to make sure as a fiduciary, our investors, are fairly compensated by that risk. But the appetite is certainly there.

And I should say, you know, as—while climate risk in terms of temperature obviously is increasing, the reality on the ground is there are many different risks, for many different businesses, for many different regions in different parts in the world. There are opportunities to create portfolios of risks for our investors. It is not a one-way bet against temperature. There are many things—there are many different ways in which people will need to tap our markets in the future.

So, in summary, I think we are a long way before we get to that point of no return. And in the meantime, our asset class already provides a very important role for market, U.S. market, the U.S. insurance markets and stability. And indeed, as risks continue to outpace supply, we believe it will grow. And there is definitely interest from the investor community to support that growth.

Ms. BROWNLEY. Thank you so much.

And, Ms. Monast, I want to say just thank you again for working with our office on this bill. We really do appreciate it.

And with that, I will yield back, Madam Chair.

Ms. CASTOR. Terrific.

I understand that the ranking member may be on his way back. So I will go to Rep. Casten, if you would like to ask your question you needed more than 30 seconds for.

Mr. CASTEN. Oh, you are very kind. I wanted—this will surprise all of you, I wanted to nerd out a little bit with Mr. Powell.

Rich, nice to see you again.

Mr. POWELL. Nice to see you too.

Mr. CASTEN. I want to really thank you for raising this comment that I think we talk about too little, about removing barriers to clean energy. We always talk about creating new incentives; we don't talk nearly enough about removing barriers. You know, the IMF has said that we have got \$650 billion a year in subsidies to the fossil fuel energy industry, which is about the—our defense budget. That is why I recently introduced the End Oil and Gas Subsidies Act, to eliminate just 11 specific provisions in our Tax Code.

But the point I want to raise with you is that you said a couple of times that the energy system costs are what matter, and they

are not competitive with subcritical coal. There is a certain efficient markets hypothesis that is buried in there.

Would you not agree that in a capital intensive commodity industry, that the party who owns the existing capital asset is sitting on a massive barrier to entry that keeps—makes it harder for other people to enter to sort of participate in an efficient market?

Mr. POWELL. Yes.

Mr. CASTEN. And would you not also agree that the costs of capital—not capital construction, but the weighted average cost of capital, equity, and debt—is an awful lot different if you are a state-subsidized electric monopoly than if you are a scrappy, independent clean energy producer?

Mr. POWELL. Sure. I mean, a regulated entity will have closer to public finance, right? And this is also, of course, the problem in a lot of the developing world, where you have state-owned enterprises like the Chinese sort of state-owned coal production and energy generation utilities that are just—you know, they employ 10 million people, and they are completely—

Mr. CASTEN. Sure.

Mr. POWELL [continuing]. 1 in 10—1 in 100 work in that industry, right?

Mr. CASTEN. Sure. And—

Mr. POWELL. And it does lead them to make some decisions which are probably not, on their face, economically rational or at least not electricity price minimizing, but they might be economic value maximizing for that entire economy or value chain in China, which, you know, might be why they are making those decisions.

Mr. CASTEN. So I spent, as you know, 20 years in the energy industry. And, you know, I remember what a shock it was when regulators actually brokered the idea that Public Service of New Hampshire might be allowed to go bankrupt. That was a complete shock to the way that utilities thought about it. And, of course, in South Africa, you know, when Eskom was facing that, it didn't happen.

So, given that, when you say that clean energy is not competitive on an energy system cost perspective with subcritical coal, I have a hard time squaring that logic, because there ain't nobody building subcritical coal plants except for state-subsidized massive utilities. And the kind of systems that Mr. Huffman was talking about are essentially being built by scrappy, independent producers—you know, people putting a solar panel on their home, you know, private companies.

So I think there is a danger when we talk about what is competitive. We can stipulate that, if we had a clean sheet of paper, technology X, if we built everything from scratch, would have a fundamentally lower cost, independent of the cost of capital, and then have a totally different question if we said, well, what about the incumbent, who already has the existing asset, who can squeeze margins a little bit and keep your cost of capital down, and effectively has a guarantee against going bankrupt. That is going to keep us from getting to the optimal.

So how should we be thinking in a more honest way about—how do we make sure that we build a true lowest-cost energy system?

Because between you and me, and I know from our prior conversations, the lowest-cost energy system is also the cleanest energy system, but there are these massive institutional barriers to getting there because of the power of incumbency and the distorting power of market subsidization of all the subsidies.

Mr. POWELL. So I do think it matters a lot on where you are in the world, what the lowest-cost energy system would be. So if you are, for example, in Pakistan and you have abundant thermal coal that you can either access domestically or in that whole, kind of, seaborne, you know, Indian Ocean thermal coal region, where you have South Africa, India, and Indonesia all competing for ultra low-cost thermal coal shipments, and then if you are building—if you were trying to rapidly electrify a population, you know, we are not only looking at the costs of building the wind and the solar, the geothermal and the hydro; we are also looking at the transmission costs, the interconnect costs, the backup costs required to level out and firm up that power.

There is actually quite a bit in there, right, in addition to just the unit costs for adding the additional wind farm—and you know as well as I do, there are two wind projects in upper MISO that had to cancel. The wind projects themselves were incredibly cost effective, but the new transmission required to access that regional transmission organization would have been twice the cost of the new wind farms, right? And so—

Mr. CASTEN. So I have chewed up my time, and, as I feared, this is—

Mr. POWELL. Okay.

Mr. CASTEN [continuing]. Going to be too long. But I guess I would just make the comment that there isn't an energy market in the world that is actually subject to truly competitive market forces.

Mr. POWELL. I will agree with that.

Mr. CASTEN. And if we don't acknowledge that in the first instance, then we get into this, "well, is something competitive on the margin" that sounds like we are talking about capitalist economics but we are not, and we just need to be careful of the words.

I yield back. Thank you so much.

Ms. CASTOR. All right. Outstanding.

Ranking Member Graves, you are recognized for 5 minutes.

Mr. GRAVES. Thank you, Madam Chair.

Madam Chair, in between witnesses or members earlier, you mentioned the climate resolution that you had invited us to cosponsor. And I do appreciate that.

Our concern with the resolution is that it actually supports or it embraces an agreement that would result in a net increase in global emissions. We would support one that would result in a decrease in emissions. We think that is better for long-term stability and certainty related to risk, which we are discussing at this hearing today.

And so I would be happy to talk with you and all members of the committee about a resolution that would actually result in global emissions going down, not one that would agree with the concept of global emissions going up, as the one referenced earlier.

Mr. Powell, Vanguard recently released an ESG fund that is designed to oppose nuclear projects. Don't want to pretend to be an expert on nuclear, necessarily, but I do know that nearly 20 percent of our electricity portfolio is provided through nuclear energy. It is an emissions-free energy source.

Just 2 weeks ago, the Nuclear Regulatory Commission approved designs of a small scale nuclear reactor. I don't know that I fully appreciate the thought behind that, and just wondering if you could shed any light or if you had any thoughts there.

Mr. POWELL. Well, first, thanks very much, Congressman Graves. Thanks for your leadership on these issues, for your introduction of BUILDER last week. To Representative Casten's point, it is extremely important to take the regulatory burdens out of the way of building new clean energy as rapidly as possible, so a very, very important step. Thank you for that.

This pains me to say as a Vanguard customer, as perhaps other folks on this are, but, you know, they have continued this troubling push in the ESG market of putting a ban on nuclear investments, right alongside—and this is ridiculous—right alongside, literally, a ban on pornography, tobacco, and firearms sales. And so they are sort of lumping, you know, nuclear energy in with a bunch of, you know, call them “sin goods,” if you will, which is, you know, I have to say, I mean, quite an outdated notion at this point and, if you are climate focused, like I am, you know, I think, pretty bankrupt, right?

So, if you are then looking at saying, well, any company that either has very significant nuclear assets, like some of the cleanest electric utilities both in the United States and around the world, or a new company that is trying to scale up a new nuclear reactor technology, that you would then be, you know, X'ed out of any ESG financing is a pretty troubling notion.

And it is something that we and many others, I think, have pointed to and said—you know, look, the broader framework of ESG, all for it. You know, companies taking into account the physical risks of climate change, you know, all for it. But these very outdated notions which cut against climate change and a solution to this problem, that seems just very counterproductive.

Mr. GRAVES. Because if we lost 20 percent of our portfolio, you are likely going to have that filled with emitting sources of electricity, and so you would result in greater emissions. I don't think you could deploy renewable technologies fast enough. And, of course, you would have the affordability issues as well. And I know that I heard Mr. Casten expressing concern about some of the market distortions from subsidies and things along those lines.

Hey, one other question, Mr. Powell. So, you know, we have an abundance of conventional energy in the United States. There is no question we do. We have all discussed many times in this committee this issue of the exportability of climate change solutions, energy solutions.

Can you talk a little bit about just this resource rich conventional fuel sources we have in the United States and the role of affordable CCS technologies and how that works in, sort of, a global strategy toward energy and climate change?

Mr. POWELL. Sure. Thanks for the question.

I mean, I think it is fair to say at this point that we have nearly infinite natural gas in this country, right, and practically infinite coal as well. And so, again, we are very focused on the emissions from various sources, not the underlying fuel source. And so, if we can find a way to take advantage of that extremely low-cost natural gas, for example, and use that as a way to displace global emissions, we think that that is a very, you know, very straightforward way that will continue to build on our energy abundance, continue to build our geopolitical opportunity and strategic, sort of, dominance in this sector.

And so, whether that is, you know, using today's technologies, exporting liquefied natural gas to the rest of the world; eventually putting up CCS gas plants on the other end of that so that, when they import the natural gas, they can then make clean electricity on site; doing what has been proposed in Louisiana with the zero-emission LNG facility that would use on-site NET Power units to liquefy that natural gas in a zero-emission way, potentially, you know, producing large amounts of hydrogen, clean hydrogen, using natural gas steam methane reformers with CCS on them. Today, that is the cleanest or the cheapest way to make zero-emission hydrogen globally, would be the, quote/unquote, "blue hydrogen" route.

So, as long as that is the cost-competitive way to move forward on flexible, zero-emission energy systems, I see no reason that we wouldn't, you know, continue to leverage that abundance we have here.

Mr. GRAVES. Thank you.

Madam Chair, thank you.

I just—look, I know that the clean-energy future and emissions reductions is a goal we all share. I just think we have to be really thoughtful about the international implications and the affordability and exportability of the solution.

So I thank you and yield back.

Ms. CASTOR. I hope we share that vision for the clean energy future, because the escalating cost and impacts of the climate crisis are upon us.

But I want to thank our witnesses today—Dr. Syroka, Ms. Monast, Mr. Powell—thank our committee members.

Your testimony was very illuminating.

So, at this point, I will adjourn the hearing. The hearing is adjourned. Thank you.

[Whereupon, at 3:45 p.m., the committee was adjourned.]

United States House of Representatives
Select Committee on the Climate Crisis

Hearing on October 1, 2020
“Creating a Climate Resilient America: Strengthening the U.S. Financial System and Expanding Economic Opportunity”

Questions for the Record
The Honorable Rostin Behnam
Commissioner
Commodity Futures Trading Commission

THE HONORABLE KATHY CASTOR

1. What are the costs to consumers, including public health implications, associated with business-as-usual electricity and energy policy? How do we maximize the benefits and minimize the costs of a transition to a clean energy economy?

The costs to consumers and the general public resulting from business-as-usual electricity and energy policy and the attendant climate change are significant. *Managing Climate Risk in the U.S. Financial System* (the “Report”)¹ describes negative impacts across the economy, including on agriculture and ecosystem services, infrastructure, and commercial and residential real estate.² With respect to general economic impact, the report notes:

[T]he latest research suggests that, by the end of this century, the negative impacts on the United States from climate change will amount to about 1.2 percent of annual gross domestic product (GDP) for every 1 degree Celsius increase (Hsiang, et al., 2017). This is roughly the equivalent of wiping out nearly half of average annual GDP growth rates in recent years. There is great uncertainty about how those losses may be distributed across the United States and within any given sector or asset class. But the research suggests that the South, Central and mid-Atlantic regions likely will be more heavily impacted than northern regions.³

In particular, the Report explores health implications in depth:

Human health is significantly exposed to climate-related physical risks. Health impacts from climate change include extreme heat exposure; degraded air quality; infectious, water- and vector-borne diseases; food contamination and declining access to nutritious foods; chronic physical and mental stress; and, physical injuries and mental distress from extreme events (Ebi, et al., 2018). Many of these health impacts and corresponding financial costs have been shown to disproportionately burden low-wage workers and historically marginalized populations (Schmeltz, et al., 2016; Wondmagegn, et al., 2019). Thus, mitigating climate change would reduce economic burdens that amplify economic inequality. For instance, a decline in the use of fossil fuels will improve air quality, which would have a disproportionately positive impact in certain marginalized communities (Bullock, et al., 2018).

These impacts could also reduce labor capacity and productivity, which in turn could reduce the capacity of workers and employers to pay for healthcare services. Most critically, extreme heat is anticipated to greatly impact human health and lead to greater rates of premature mortality. From extreme heat alone, annual damages from premature death in 2090 were projected to be between \$60 billion (2015) and \$140 billion (EPA, 2017). States in the Southeast and Great Plains could see declines in labor capacity approaching 3 percent (Dunne, et al., 2013; Houser, et al., 2015); some locations in Florida and Texas could see a total loss in annual labor hours of 6 percent or more (Gordon, 2014; EPA, 2017). Six percent is the equivalent of losing two weeks of income a year. By 2090, total impacts from extreme heat attributed to climate change could result in more than 2 billion lost labor hours, corresponding to \$160 billion (2015) in lost wages (Graff Zivin and Neidell, 2014; Hsiang, et al., 2017; EPA, 2017).

¹ *Managing Climate Risk in the U.S. Financial System, Report to the CFTC’s Market Risk Advisory Committee by the Climate-Related Market Risk Subcommittee* (Sept. 2020), https://www.cftc.gov/About/AdvisoryCommittees/MarketRiskAdvisory/MRAC_Reports.html (the “Report”).

² *Id.* at 13–19.

³ *Id.* at 13.

Indeed, companies that rely on outdoor and manual labor may face physical risks from declining labor productivity and higher costs associated with workers' compensation, health insurance, and general liability insurance. They may also face pressure to increase wages to attract workers for such physically demanding employment (Day, et al., 2019)

Finally, as the COVID-19 pandemic has made clear, healthcare and public health systems in the United States have limited excess capacity to treat patients during extreme events (Bein, et al., 2019). Such events could include, for example, events stemming from infectious diseases and tropical cyclones attributable, in part, to climate change (Wu, et al., 2016). Public health infrastructure in the United States and around the world has been affected by significant reductions of public investment in recent decades (Masters, et al., 2017). Unless this trend is reversed, the U.S. healthcare system may not be able to cope with the burdens from climate-related physical risk. For instance, healthcare facilities, networks and enterprises could face financial challenges associated with the exposure of highly vulnerable and aging populations subject to increasing climate-attributed stresses, such as extreme heat and infectious disease, and shocks, such as stronger hurricanes and wildfires (Desai, et al., 2019).⁴

To maximize the benefits and minimize the costs of a transition to a clean energy economy, we must act swiftly but thoughtfully. The Report asserts that:

[T]he longer governments wait to adequately cut emissions, the more rapidly physical and transition risks are likely to increase in parallel. The physical impacts of climate change will intensify while the magnitude of the response needed to arrest further warming grows. The public and private sectors must simultaneously advance both climate mitigation and adaptation to effectively manage both physical and transition risks.⁵

2. Please comment on the expected economic impact that would result from dramatic action to reduce carbon emissions, relative to the alternative of not mitigating carbon emissions. For example, what is the expected effect on GDP growth associated with achieving global net-zero emissions by mid-century, relative to the alternative of unmitigated global emissions, such as the IPCC RCP8.5 scenario?

The Report notes that dramatically reducing carbon emissions to limit warming to “well below” 2 degrees Celsius would “. . . boost total global GDP by 2.5 percent, or 5.3 percent when considering the avoided climate-related damages relative to the reference case (maintenance of current plans and policies).”⁶

3. In your testimony, you discussed the CFTC MRAC report calls for better understanding, quantification, disclosure, and management of climate-related risks by financial institutions and other market participants. What steps should Congress take to enable the development of common metrics and methodologies to support climate risk reporting and disclosure?

To enable the development of common metrics and methodologies, the Report suggests that:

Financial regulators, in coordination with the private sector, should support the development of U.S.-appropriate standardized and consistent classification systems or taxonomies for physical and transition risks, exposure, sensitivity, vulnerability, adaptation, and resilience, spanning asset classes and sectors, in order to define core terms supporting the comparison of climate risk data and associated financial products and services. To develop this guidance, the United States should study the establishment of a Standards Developing Organization (SDO) composed of public and private sector members. Recognizing that this guidance will be specific to the United States, this effort should include international engagement in order to ensure coordination across global definitions to the extent practicable.⁷

⁴*Id.* at 17–18.

⁵*Id.* at 22.

⁶*Id.* at 104.

⁷*Id.* at 70.

4. In addition to directly addressing climate-related risks to financial sector stability, what steps can Congress take to blunt the impact of climate-related financial shocks to households and businesses with the fewest resources to respond, especially in communities that have been historically marginalized and experienced environmental injustice?

As I stated in my testimony, the Report recognizes that climate change already has placed disproportionate burdens on low-to-moderate income households and historically marginalized communities. As a result, all of the recommendations and the frame of the entire Report consider impacts on low-to-moderate income households and marginalized communities. Any policy prescription must not exacerbate existing inequitable burdens of climate change. This is absolutely critical in ensuring that any future policy does not make the problem worse. One approach to blunt the impact of climate-related financial shocks to these communities is found in recommendations 8.1 and 8.2 of the Report. These recommendations lean heavily on the opportunities that emerge from smart climate policy, and from congressional and regulatory action to spur investment, innovation and economic productivity.

Recommendation 8.1: The United States should consider integration of climate risk into fiscal policy, particularly for economic stimulus activities covering infrastructure, disaster relief, or other federal rebuilding. Current and ongoing fiscal policy decisions have implications for climate risk across the financial system.

Recommendation 8.2: The United States should consolidate and expand government efforts, including loan authorities and co-investment programs, that are focused on addressing market failures by catalyzing private sector climate-related investment. This effort could centralize existing clean energy and climate resilience loan authorities and co-investment programs into a coordinated federal umbrella.⁸

If carefully crafted with the recognition that climate change has posed inequitable burdens, fiscal policy and government programs correcting market failures can blunt the impact of climate-related financial shocks. More importantly, these steps can spur economic growth, job creation, and resilience in the very communities that have been historically marginalized and have suffered environmental injustice.

Questions for the Record

Joanna Syroka

**Senior Underwriter and Director of New Markets
Fermat Capital Management, LLC**

THE HONORABLE KATHY CASTOR

1. In your testimony, you described how insurance-linked securities (ILS), including catastrophe bonds, could be harnessed to accelerate resilient recovery from disasters. Could you please elaborate on some specific ways that state, local, and other public entities could further tap into these ILS resources, and how the U.S. federal government could be a helpful partner to make this happen?

As noted in my testimony, ILS have played an important role in stabilizing the national insurance market and lowering property insurance costs for individuals and businesses in the United States. However, the ILS technology and the inherent benefits of the ILS marketplace can be applied more broadly and innovatively than they have been to date in the country.

As illustrated by examples from overseas, ILS can be applied to areas where insurance doesn't currently exist and to help local and national governments accelerate disaster recovery for their economy and for affected communities. While the functions of ILS and traditional insurance markets are similar, they differ in one key aspect: while traditional insurance tends to target individual policyholders, ILS focus on if an event will occur and once it does, payouts can be distributed in any way that is necessary for an effective, predictable and early response. This opens up a world of new possibilities where fully collateralized contingency funds can be rapidly deployed to areas and communities in need following a catastrophe. To unlock the full value of such contingency funding, it should be paired with contingency plans that outline how funds will be programed to facilitate a *resilient* recovery, that not only protects livelihoods in the immediate aftermath but that will also help those affected build back better for the future.

⁸*Id.* at 116.

Investment in early, predictable responses to communities in disaster-prone regions is expected to be more cost-effective than a slow and late response that allows a crisis to become acute, and evidence from the ground increasingly supports this. For example, in Mexico, FONDEN was established in the late 1990s by the Mexican government to manage the risk created by natural disasters and to support emergency relief operations and the rapid rehabilitation of federal and state infrastructure affected by these adverse events. The majority of FONDEN funds are spent on the reconstruction of low-income housing and public infrastructure after disasters. Facilitated by the World Bank, since 2009 FONDEN has been a regular sponsor of catastrophe bonds to help finance these response efforts. After nearly a decade and a half of operation, results indicate that, in the year following the disaster, municipalities with access to rapidly disbursed FONDEN disaster funds grew between 2% to 4% more than those without FONDEN.[1] Overall, with conservative benefit-cost ratios in the range of 1.5 to 3, the evidence shows that FONDEN, including the cost of the catastrophe bonds it has sponsored, has provided cost-effective protection from the public service disruptions caused by natural disasters. Other studies have shown similar net positive multiples that speak to the overall net positive economic benefit of responding early rather than late through insurance-like mechanisms.[2]

Many applications, pairing contingency planning with insurance-like mechanisms to provide contingency financing, can be conceived of in the United States at the state, local and public entity level to address the needs of vulnerable communities using the data and information available today. The U.S. federal government can do much to facilitate and encourage such innovation. As mentioned in my written testimony, technical assistance for entities that wish to design such new programs is a key way in which the federal government can provide support. The expertise to create deployable public-private partnerships that can effectively leverage the ILS market for the purposes of accelerated resilient recovery from disasters exists within the re/insurance and ILS markets—including within FEMA that has experience with catastrophe bond issuance—and, critically, within public entities and international organizations around the world that have pioneered such approaches and understand how programs should be designed to unlock the promise of timely and reliable disaster funding. Identifying ways in which funds of existing or new federal programs could be used to pay for such technical expertise, and encouraging their use for such a purpose, would be an important step towards transforming the idea of effective and timely disaster response using modern financing tools into an operational reality here in the United States. The Select Committee's majority staff report, "Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America", has many pertinent recommendations on how federal hazard mitigation programs, recovery programs and incentives can be aligned and leveraged to this effect.[3]

While much can be done now with the data that already exists, consistent, reliable, high-quality and actionable climate data and real-time earth observations are always important to developing better risk management and mitigation solutions, including ILS applications that respond more quickly and in a more targeted manner to needs. As such, the recommendations on actionable climate risk information in the Select Committee's majority staff report, "Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America", are also an important way in which the federal government can support innovation to harness the potential of ILS markets to accelerate resilient recovery from disasters.[4]

2. In your testimony, you noted that investors are actively seeking Environmental, Social, and Governance (ESG) investment opportunities. Could you please describe some of the obstacles to meaningful ESG investing, including disagreement over standards and concerns over "greenwashing"? What are some actions that could be taken to overcome these obstacles to ESG?

At Fermat we believe the ILS asset class is inherently aligned with positive ESG principles, which makes it somewhat different to other, more traditional assets classes such as equities and bonds where investors are either owners of, or lenders to, companies. As a result, we have experienced an uptick in investor interest in the asset class in recent years and seen an increased number of ESG-related requests for information.

As an investment manager, we obviously value accurate, pertinent and informative disclosures. At Fermat, we prioritize the analysis of the risk disclosures in ILS submissions in our underwriting and investment process. As one of the main risks underpinning investments in the ILS sector is weather risk, quantifying physical climate-related risks to ILS is a core component of the ILS underwriting and invest-

ment process. For this reason, environmental considerations—the E of ESG—are closely linked with ILS. For example, every U.S. hurricane catastrophe bond indicates the risk of the bond both with and without the impact of factors such as elevated sea surface temperature to assess the possible effects of climate change on hurricane activity.^[5] These types of analyses and different views allow investors to evaluate the sensitivity of specific ILS transactions and their portfolios to potential climate-related changes to hurricane activity. Risk disclosures, that provide transparent and appropriate data, risk modelling and sensitivity analyses helpful for establishing a reasonable bound on the risk of an ILS investment for the risk period in question, are welcome in our market. Looking forward, as our market grows, such high-quality disclosures will be even more important. They will help investors overcome climate change concerns with respect to deploying more capital to the sector and they will help the market establish an appropriate price—and provide that critical market indication—to ILS sponsors for the risks they cede.

Weather-related risk disclosures in general are standard in the ILS market, as ILS investments specifically target these risks, helping ILS sponsors manage the consequences of risk events when they occur. Such disclosures, however, are not standard in other financial markets. Given the increasing interest in the impact of weather and climate change on organizations and their operations, there is much know-how within our market that can be applied to quantifying such risks for companies, and other private and public entities. As more organizations begin to identify, quantify and then disclose their weather and climate risks, we believe the ILS market is also well positioned to help these entities manage their financial impact.

Speaking more broadly, as an investment manager we observe that many other investment managers are committed to ESG principles and increasingly perceive them as imperative inputs into their investment decision-making process. They are very aware of the risk of “greenwashing” and actively seek to avoid such investments and the negative reputational risk associated with them. We believe the main obstacle for ESG-oriented investors, therefore, is further transparency from companies on ESG issues.

REFERENCES

[1] Source: de Janvry, A., et al., “Insuring Growth: The Impact of Disaster Funds on Economic Reconstruction in Mexico”, June 2016, World Bank, Washington DC. Available online at: <https://openknowledge.worldbank.org/bitstream/handle/10986/24631/Insuring0growth0nstruction0in0Mexico.pdf?sequence=1&isAllowed=y>.

[2] Clarke, D. J., and R. Vargas Hill, “Cost-Benefit Analysis of the African Risk Capacity Facility”, Discussion Paper 01292, September 2013, International Food Policy Research Institute, Washington DC. Available online at: <https://ebrary.ifpri.org/digital/collection/p15738coll2/id/127813>.

[3] In particular, see the *Reduce Climate Disaster Risk and Costs* (p390) and *Accelerate Resilient Disaster Recovery* (p401) sections of the Select Committee’s majority staff report, “Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America”. Available online at: <https://climatecrisis.house.gov/report>.

[4] See the *Develop and Deploy Actional Climate Risk Information* section (p374) of the Select Committee’s majority staff report, “Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America”. Available online at: <https://climatecrisis.house.gov/report>.

[5] The IPCC’s most recent AR5 report states it is very likely that anthropogenic forcings have made a substantial contribution to increases in global upper ocean heat content, and hence SSTs, observed since the 1970s. Source: “Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change”, 2014, Intergovernmental Panel on Climate Change. Available online at: <https://www.ipcc.ch/assessment-report/ar5/>.

Questions for the Record
Maggie Monast
Director of Working Lands
Environmental Defense Fund

THE HONORABLE KATHY CASTOR

1. In your testimony, you noted the importance of adopting conservation practices that improve soil health and build resilience. EDF's recent report also identifies barriers to financing resilient agriculture. What are the barriers to loan products that are aligned with resilient farming practices? What would a loan product that supports resilience look like?

Environmental Defense Fund (EDF) and multiple other organizations are working to quantify the farm budget impacts of conservation practices that build resilience. When evaluated as a multi-year investment, resilient agricultural practices such as no-till, cover crops, and extended crop rotations can generate significant financial benefits to farming operations in the form of cost savings, resilient crop yields, and diverse income streams. While some costs increase, in many cases they can be offset by other cost savings and yield benefits.ⁱ When farmers are able to attract additional revenue, the financial case is even stronger. However, despite the long-term benefits, the transition period may deter many farmers from adopting these practices—especially in economically challenging times.

The financial challenges farmers face in the transition to adopting more resilient practices are made more difficult due to the fact that farm loan products do not explicitly incorporate the value of resilient agriculture or support farmers through the transition.ⁱⁱ There are several ways in which current loan offerings do not align with the financial attributes of resilient farming practices, and therefore create challenges for farmer clients that use or are considering adopting more resilient practices:

- **Information gaps:** First, there is less data available to lenders on the return proposition of resilient practices than conventional farming practices, and many lenders are unaware of the data that does exist. This information gap disadvantages both farmers and lenders in developing reasonable projections of the financial impacts of the transition to resilient practices. Continued efforts to create locally relevant analyses of the finances of farms that use resilient practices can help fill that gap, as can lender efforts to educate themselves on the information that is available.

- **Short-term focus:** The annual nature of many crop cycles and associated business practices, including annual operating loans, compels farmers and their financial partners to focus on short-term cash flow rather than longer-term profitability and value.ⁱⁱⁱ This has the potential to create significant blind spots. For example, soil degradation or mining for nutrients can produce high yields in the short term, but over the long term such practices undermine crop productivity and the value of the land asset.^{iv} Similarly, excess water consumption for irrigation can lead to future water scarcity and the risk of crop failure.^v Last, extended crop rotations may also cause variability in revenue in the short term, but greater stability over the long term.^{vi} With risk and loan assessment conducted on a single-year basis, short-term risk is given more weight than long-term stability.^{vii} If success is only defined as the farmer's ability to repay his or her annual operating loan, farmers and lenders will miss opportunities to reduce risk and maximize long-term profitability.

- **Loan terms do not value resilience:** While farmers who use crop insurance are able to access significantly better loan terms, farmers who utilize a production-system risk reduction strategy receive little or no benefits.^{viii} In addition, lenders do not provide short-term accommodations in loan terms for farmers who are transitioning to more resilient practices. Some lenders contend that if farmers increase their financial health and stability by using resilient practices, ultimately their lending terms will improve along with the farm's improved financial performance. However, this is a lagging indicator and does not support farmers in navigating the transition so that they can arrive at the better outcome. Farmers face an additional barrier to conservation adoption when they cannot partner with their lenders to plan for the transition period and take a multi-year view of conservation investments.

Agricultural lenders in the U.S. do not currently collect financial data specific to resilient practices, incorporate the risk-reduction potential of resilient farming practices into their risk ratings, or design programs or products to support farmers in managing the transition to practices that improve resilience. Some in the lending sector may ask why such changes are needed, when many farmers currently finance

their conservation expenses with existing loan products. While this is true, it is also true that existing products were developed with conventional farming practices in mind and are not designed to support farmers in overcoming the unique financial characteristics of the adoption of resilient farming practices. As such, this places the onus of navigating the existing loan products and structures on the farmer who desires to increase resilience. This disconnect creates a structural disincentive to change, and contributes to persistently low conservation adoption levels. Ultimately, this results in sub-optimal outcomes both for farmers and for lenders seeking the best risk-adjusted return.

On the other hand, there are market opportunities for lenders who engage with their farmer clients who are interested in resilient practices and seek to meet their needs. There are several examples of existing lender initiatives and programs that can inform efforts to develop programming or products that support farmer adoption of resilient farming practices. These include programs for Young, Beginning and Small Farmers^{ix} and recently launched organic transition loans.^x

Loan products that support resilience should be designed using the following five lessons, identified by EDF through extensive interviews with agricultural lenders and other experts:

- **Lesson 1: Understand the financial benefits of and barriers to resilient agricultural practices.** Lenders should understand the benefits of resilient agriculture so that they can effectively serve their current borrowers and don't let unfamiliarity with conservation practices discourage farmers or increase barriers to lending. Lenders should also improve their understanding of the return profile of transitions to resilient agriculture, including the benefits, barriers, and the transition timeframe in order to identify farmer needs or market gaps that could be addressed with new or modified loan products. Agricultural lenders do not currently collect information from farmer clients that gives them the level of detail needed to assess this, but organizations working to quantify the financial impact of conservation adoption on farm budgets can provide useful information on the type and magnitude of potential costs, savings and crop yield impacts. Lenders can collaborate with those organizations to provide feedback on the type of information needed to inform their decision-making.

- **Lesson 2: Design loan structures and requirements to correspond with the financial characteristics of the resilient practice(s).** Lenders may select a subset of resilient farming practices particularly suited to their region or desired by local farmers. Based on their understanding of the financial shift that is taking place (e.g. any upfront costs or yield impacts, how cost savings and yield benefits occur over time), they should consider how to shift the requirements of the loan to accommodate those expected changes. For example, lenders could consider modifying the length of the loan or utilizing a longer planning horizon with streamlined loan renewals, relaxing some credit standards in the first few years of the transition, or reducing the interest rate to encourage farmer uptake.

- **Lesson 3: Loan support may be needed to launch initial products and should be used to prove the financial case.** If it is difficult to make a loan product acceptable for the lender and meet the needs of the farmer at the outset due to insufficient data on the return proposition, then loan support can be used to bridge the gap. Loan support is when a partner (corporate partner, investor, philanthropic or public source) provides additional financial risk-sharing to make the overall loan package work for both the lender and the farmer. An important role for loan support is to create examples and track records to build on, and to support data collection in a product pilot phase in order to prove the financial hypothesis for the product to stand on its own. Loan support can take many different forms, including production contracts, loan guarantees, subordinated debt, and more.

- **Lesson 4: Collect data on financial and environmental performance to show results, fine-tune loans and adjust credit rating processes.** While external financial support may be necessary to launch new or modified loan programs for resilient agriculture, such support should be utilized to test a loan product that can ultimately stand on its own from a financial standpoint. For this to occur, data collection on both the financial and environmental performance of the farm and the loan is essential. This is another area where collaboration can prove useful to the lender, whether it is with an environmental or agricultural organization that can advise on appropriate environmental metrics, or an agriculture technology provider that can assist in data collection and analysis. This data can enable a positive feedback loop for continuous improvement, both for individual farmers as well as the lenders' overall view of

its portfolio and products. As lenders build a knowledgebase from empirical data around resilient practices and results, they can modify credit rating processes to incorporate this data. Ultimately, the objective is to accurately demonstrate the value of resilient farming practices and integrate these results into lender policies and pricing for farmers who implement practices that build resilience in their operations.

- **Lesson 5: Consider other forms of support farmers may need to ensure successful practice adoption—and avoid creating new burdens.** Additional support could take the form of financial arrangements, such as grain offtake agreements or cost-share for conservation expenses, or educational support, such as agronomic advice on how to incorporate new practices into farms' existing management systems. Some of these forms of support can be offered by lenders, while others may need to be part of a broader program with partners. For example, while some degree of trial and error will nearly always be required to integrate new practices to a farming operation, technical assistance and education can support farmers in moving up the learning curve. In addition, creating a financial plan for the transition can help both parties set realistic expectations and then continue to check in on whether changes to the farm's finances are occurring as planned. Finally, for a new or modified lending product to be used, it should avoid creating burdensome new requirements for farmers and should have terms that are competitive with other offerings in the market.

More information on these barriers and opportunities can be found in EDF's report, *Financing Resilient Agriculture: How agricultural lenders can reduce climate risk and help farmers build resilience*.

2. Your testimony noted the gaps in information and data as a barrier to financing resilient agriculture. What should Congress do to bridge data gaps, and how can federal agencies like USDA do a better job coordinating their data collection and delivery to guide climate-smart finance in the agricultural sector?

We agree with the House Select Committee on the Climate Crisis' Majority Staff Report, *Solving the Climate Crisis*, on its recommendation for Congress to incentivize standardized data collection to demonstrate the reduced risk and profitability benefits of conservation practices. While many studies analyze farmer budgets and other relevant data sources, there is a critical need to expand such analysis and connect it to the type of information required by agricultural lenders and crop insurers for decision-making and risk analysis. For example, farm-level data on conservation practice adoption, costs and profitability, crop yields and weather risk are all needed to better understand the financial benefits and barriers of resilient agriculture. However, numerous disparate systems (e.g., on-farm equipment vs. satellites) generate these data in non-standardized formats (e.g., survey, census, transactional records, market prices). Further, the data are managed by different government agencies, universities, and private firms, who each have their own standards, definitions, and privacy guidelines. In many cases, researchers need permission and a pathway to access, interpret, and integrate disparate data from multiple systems.^{xi}

Environmental Defense Fund is a member of the AGree Economic and Environmental Risk Coalition, which includes researchers, academics, producers, former officers of the U.S. Department of Agriculture (USDA), and non-profit environmental and agricultural organizations.^{xii} The AGree Coalition has found that increased integration and analysis of USDA's vast resource of agricultural data is a proven strategy for delivering key research insights needed to advance innovation in the food and agriculture sector. USDA has several opportunities to act to improve data innovation and research, both internally at the agency and externally with partners, but has not moved quickly without Congressional direction and support.

USDA has started this work by creating a system of internal data dashboards for USDA Mission Areas. This shared, internal USDA platform makes data available across office leadership to inform decision-making. This system has increased USDA's capacity to generate important insights, developed through analysis of robust data sets, across the agency. We ask that Congress support USDA to continue this work and extend it to all Mission Areas across the agency. Congress should encourage USDA to expand the scope of these data dashboards to incorporate more types of data for the purposes of research, in addition to organizational decision-making.

USDA can also support new and innovative research by land-grant universities using the agricultural data it collects. Section 1619 of the 2008 Farm Bill allows the sharing of USDA agricultural data with land grant institutions for the purposes of

technical assistance. Congress should direct USDA to immediately begin establishing agreements with researchers to answer key research questions related to the agency's production and environmental goals. This expanded research capacity will help to create the strong scientific basis to drive innovation forward. These innovations in data sharing and analysis can be executed in a way that prioritizes data security and protects producers' personally identifiable information.

There are also opportunities to spur public-private collaboration in data interoperability—including data standardization and aggregation at scale, and crosscutting analyses that can deliver insights that each disparate set of data cannot on its own. For example, data collected by agricultural technology companies can be integrated with public data sources to enhance the decision-making of farmers, agricultural lenders, crop insurers, policymakers, and other key stakeholders. This broader data set could be analyzed by a publicly available analytics platform that could generate the same insights that private software providers offer behind pay walls.

An important point of caution in this area is to avoid relying entirely on data sources that exclude small farmers and farmers of color. For example, farm management software solutions are more commonly available to and used by large-scale farmers; small farmers and farmers of color are not as likely to utilize this technology.^{xiii} The path forward to demonstrate the reduced risk and profitability benefits of resilient agriculture will require methods to assess the financial performance and resilience of farms of all types and sizes, and an openness to learn from a variety of different operations. An important role for Congress and the Administration is to support the advancement of data-driven decision-making capabilities that are critical to understanding and planning for climate resilient agriculture, in ways that are inclusive of the needs and expertise of small farmers and farmers of color.

There is a well-recognized need to establish and quantify risk and conservation practices at scale and incorporate them into policy, insurance, lending, and conservation programs.^{xiv} The advances in data coordination and analysis described above would represent important progress towards equipping researchers, government agencies and the private sector to do so.

REFERENCES

ⁱ Monast, Maggie and KCoe Isom AgKnowledge. (2018). Farm Finance and Conservation: How stewardship generates value for farmers, lenders, insurers and landowners. Retrieved from: <https://edf.org/farm-finance>.

ⁱⁱ Monast, Maggie. (2020). Financing Resilient Agriculture: How agricultural lenders can reduce climate risk and help farmers build resilience. Retrieved from: <https://edf.org/aglending>.

ⁱⁱⁱ Personal communication, agricultural lender PD, October 2019.

^{iv} Eswaran, H., R. Lal and P.F. Reich. 2001. Land degradation: an overview. In: Bridges, E.M., I.D. Hannam, L.R. Oldeman, F.W.T. Pening de Vries, S.J. Scherr, and S. Sompatpanit (eds.). Responses to Land Degradation. Proc. 2nd. International Conference on Land Degradation and Desertification, Khon Kaen, Thailand. Oxford Press, New Delhi, India. Accessed at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/?cid=nrcs142p2_054028.

^v Council for Agricultural Science and Technology (CAST). (2019). Aquifer Depletion and Potential Impacts on Long-term Irrigated Agricultural Productivity. Issue Paper 63. CAST, Ames, Iowa. Retrieved from <https://www.cast-science.org/wp-content/uploads/2019/02/CAST-IP63-Aquifer-Depletion.pdf>.

^{vi} Bowles et al. Long-Term Evidence Shows that Crop-Rotation Diversification Increases Agricultural Resilience to Adverse Growing Conditions in North America. *One Earth* 2, 284–293, March 20, 2020.

^{vii} Personal communication, Scott Marlow, Long Rows Consulting. July 2020.

^{viii} Woodard, J. & Marlow, S. (2017, April). Crop Insurance, Credit, and Conservation. The AGree Economic and Environmental Risk Coalition. Retrieved From: <https://foodandagpolicy.org/wp-content/uploads/sites/4/2019/09/2017-April-Crop-Insurance-Credit-and-Conservation.pdf>.

^{ix} Pellett, Nancy. (2007, August 10). Revised Bookletter 040—Providing Sound and Constructive Credit to Young, Beginning, and Small Farmers, Ranchers, and Producers or Harvesters of Aquatic Products. Retrieved from: https://ww3.fca.gov/readingrm/Handbook/_layouts/15/WopiFrame.aspx?sourcedoc={788991C0-7E8B-43AC-ADB4-55C500B85A94}&file=BL-040%20REVISED.docx&action=default.

^x Rabo AgriFinance. (2019, October 24). “Rabo AgriFinance Designs Industry's First Organic Transition Loan Offering.” Retrieved from: <https://www.raboag.com/news/rabo-agrifinance-designs-industrys-first-organic-transition-loan-offering-54>.

^{xi} Woodard, J. et al. (2019). Harnessing the Power of Data to Improve Agricultural Policy and Conservation Outcomes. *Choices*, 34(3), 1–7. Retrieved from: https://foodandagpolicy.org/wp-content/uploads/sites/4/2019/10/cmsarticle_706.pdf.

^{xii}AGree Economic and Environmental Risk Coalition. Retrieved from: <https://foodandagpolicy.org/>.

^{xiii}McDonald, J., Korb, P., Hoppe, R. (2013, August). Farm Size and the Organization of U.S. Crop Farming. U.S. Department of Agriculture Economic Research Service. Retrieved from: https://www.ers.usda.gov/webdocs/publications/45108/39359_err152.pdf.

^{xiv}Woodward et al. 2019.

