AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

CREATING A CLIMATE RESILIENT AMERICA: BUSINESS VIEWS ON THE COSTS OF THE CLIMATE CRISIS

HEARING

BEFORE THE

SELECT COMMITTEE ON THE CLIMATE CRISIS HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

HEARING HELD
JULY 25, 2019

Serial No. 116–7

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

U.S. GOVERNMENT PUBLISHING OFFICE
37–917 WASHINGTON : 2019

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	2
Hon. Garrett Graves, a Representative in Congress from the State of Louisiana, and Ranking Member, Select Committee on the Climate Crisis:	
Opening Statement	3

WITNESSES

Paula DiPerna, Special Advisor, CDP North America	
Oral Statement	5
Prepared Statement	7
Garvin Jabusch, Chief Investment Officer, Green Alpha Advisors, LLC	
Oral Statement	15
Prepared Statement	17
Jay Walker, Executive Vice President, South Louisiana Bank	
Oral Statement	18
Prepared Statement	20
Francis Bouchard, Group Head of Public Affairs and Sustainability, Zurich Insurance Group	
Oral Statement	23
Prepared Statement	25

SUBMISSION FOR THE RECORD

Letter from 52 organizations in support of H.R. 3623, the Climate Risk Disclosure Act of 2019, submitted for the record by Mr. Casten	45

APPENDIX

Questions for the Record from Hon. Kathy Castor to Paula DiPerna	55

CREATING A CLIMATE RESILIENT AMERICA: BUSINESS VIEWS ON THE COSTS OF THE CLIMATE CRISIS

THURSDAY, JULY 25, 2019

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

The committee met, pursuant to call, at 2:11 p.m., in Room 2261, Rayburn House Office Building, Hon. Kathy Castor [chairwoman of the committee] presiding.

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

Ms. CASTOR. Well, good afternoon, everyone. The committee will come to order.

Welcome to the July 25, 2019, hearing of the House Select Committee on the Climate Crisis. Without objection, the chair is authorized to declare a recess at any time.

Today, we will discuss the risks, costs, and opportunities that businesses, investors, and the economy face as a result of the climate crisis. I now recognize myself for 5 minutes to give an opening statement.

Today, we are examining the escalating risks and costs of the climate crisis. When we look at these risks, we see some big numbers. And when businesses across America look at the growing risks, they also see huge peril ahead.

In 2017 alone, insurance companies paid out a record $135 billion in climate losses, with $100 billion just in the United States. The world's largest businesses estimate that they face nearly $1 trillion of climate-related risks. That is trillion with a T.

The risks have gotten so large, the Federal Reserve is now interested. This fall, the Federal Reserve Bank of San Francisco is hosting its first conference on how the banking system will deal with climate change. The Fed has identified climate change as one of three forces transforming the economy this century, and experts there recognize the need to understand the financial implications of it to fulfill their obligation to foster financial stability.

The numbers are eye-popping, but the costs come in real human terms. When a home or business floods, a cascade of financial implications follows. The value takes a hit. They may have to relocate and pay to live or work somewhere else. The insurance company has to cover their losses. The reinsurance company has to cover the insurance companies losses. And evidence shows that these losses will continue to grow.

And when the disaster is large, we step in here in the Congress because we have an obligation to our fellow Americans when disasters strike. But experts say we should be investing more to avoid disasters in the first place.

Rising heat projections highlight other serious risks. When we face brutal heat waves, it is too hot to work outside. People who work outside don't get paid for not working. And I want everyone to think back to just a few days ago with the massive, brutal heat wave that kept many of our neighbors inside and off the job. That is the type of heat that wilts crops. It is the type of heat that keeps us cooped up indoors instead of enjoying our summers. And when we face heat like that, businesses take a hit too. Many sectors of the economy are impacted, and the risks will grow.

So thank you to our witnesses today for being here, for kicking off what needs to be an ongoing dialogue with members of this committee relating to the material risks of the climate crisis for businesses, insurers, and all Americans.

Climate change is impacting our economy now, not 50 years from now. It is happening now. This is important because, for years, big businesses ignored the climate crisis. Some even actively promoted climate denial. Some still do, but increasingly, with the help of experts who measure growing economic risks, with the help of scientists and shareholder activists, businesses not only recognize the growing economic climb of the climate crisis, but they recognize that we can solve it and create new opportunities, create new industries, and grow jobs.

Recognizing the risks, investors are getting out of fossil fuels. They are looking at opportunities to create the next wave of clean energy and clean transportation technology. They are building the clean energy economy because that must be the future.

It is no longer business as usual. We need to go further. We need to make a 100 percent clean energy future our shared objective.

As we heard in our second hearing, global carbon emissions need to reach net zero by 2050 to give us a chance of avoiding the most catastrophic impacts of climate change. The alternative isn't just unacceptable, it is dangerous and would be very costly to everyone.

So I am looking forward to hearing from our witnesses about how Congress can highlight their work regarding the growing risks, shift the country to clean energy, and protect the places that we know and love.

At this time, I will recognize Ranking Member Graves for an opening statement.

[The statement of Ms. Castor follows:]

Opening Statement (As Prepared for Delivery), Rep. Kathy Castor (D–FL), U.S. House Select Committee on the Climate Crisis

Creating a Climate Resilient America: Business Views on the Costs of the Climate Crisis, July 25, 2019

Today we're examining the escalating risks and costs of the climate crisis. When we look at these risks, we see some big numbers. And when businesses across America look at the growing risks, they also see huge peril ahead.

In 2017 alone, insurance companies paid out a record $135 billion in climate losses, with $100 billion just in the United States. The world's largest businesses estimate that they face nearly a trillion dollars of climate-related risks. That's trillion with a "t."

The risks have gotten so large, the Federal Reserve is now interested. This fall the Federal Reserve Bank of San Francisco is hosting its first conference on how the banking system will deal with climate change. The Fed has identified climate change as one of three forces transforming the economy this century and experts there recognize the need to understand the financial implications of it to fulfill their obligation to foster financial stability.

The numbers are eye-popping, but the costs come in real human terms.

When a home or business floods, a cascade of financial implications follows. The value takes a hit. They may have to relocate and pay to live or work somewhere else. The insurance company has to cover their losses. The reinsurance company has to cover the insurance company's losses. Evidence shows those losses continue to grow.

And when the disaster is large, we step in here in Congress because we have an obligation to help our fellow Americans when disasters strike. But experts say that we should be investing more to avoid disasters in the first place.

Rising heat projections highlight other serious risks. When we face brutal heat waves, it's too hot to work outside. People who work outside don't get paid for work they can't do. I want everyone to think back to just a few days ago when many of us were sweltering in hot, muggy heat waves. That's the type of heat that wilts crops. It's the type of heat that keeps us cooped up indoors instead of enjoying our summers. When we face heat like that, businesses take a hit, too. Many sectors of the economy are impacted and the risks will grow.

So thank you to our witnesses today for kicking off what needs to be an ongoing dialogue with members of this committee relating to the material risks of the climate crisis for businesses, insurers and all Americans. Climate change is impacting our economy now, not 50 years down the road. Now.

This is important because for years, big businesses ignored the climate crisis. Some even actively promoted climate denial. Some still do. But increasingly—with the help of experts who measure growing economic risks, with the help of scientists, and shareholder activists—businesses not only recognize the growing economic harm of the climate crisis but they recognize that we can solve it and create new opportunities, industries and jobs in doing so.

Recognizing the risks, investors are getting out of fossil fuels. They're looking at opportunities to create the next wave of clean energy and clean transportation technology. They're building the clean energy economy because that must be the future.

It's no longer business as usual. We need to go further. We need to make a 100% clean energy future our shared objective. As we heard in our second hearing, global carbon emissions need to reach net-zero by 2050 to give us a chance of avoiding the most catastrophic impacts of climate change. The alternative isn't just unacceptable, it's dangerous and very costly to everyone.

So I'm looking forward to hearing from our witnesses about how Congress can highlight their work regarding the growing risks, shift the country to clean energy and protect the places we know and love.

Mr. GRAVES. Thank you, Madam Chair.

I want to thank all the witnesses for being here today. I appreciate you joining us, and those in the audience as well.

Madam Chair, as you know, we can look across the United States, and through the Corps of Engineers water resource program, we have about $100 billion in project authorizations. Many of these are the projects that are designed to improve the resilience of this Nation. This is a key issue that we must aggressively address, that we address. And let's be clear, the status quo what we have done historically for decades is absolutely inappropriate, it doesn't properly prioritize. It is not the process that corresponds to the urgency that we are facing.

As you all know, we can reduce, as we have had witness after witness testify before this committee, we could cut all emissions from the United States today, every bit of emissions, and we are going to continue to see changes in our weather, we are going to continue to see seas rise. Especially when you recognize the fact that climate change is a global issue, you recognize the fact that the United States has actually reduced emissions by approximately

1 billion tons. And during that same period of time, China has increased their emissions by 4 billion tons. There is momentum built up in the environment, in the climate. If we do not have truly a global approach to this, then no matter how aggressive the efforts are in the United States, it will not change the trajectory that we are on. We also need to recognize the importance or the urgency of resiliency, because even if we cut all emissions from around the globe, we would continue to have momentum and continue to have change in our environment.

One of the reasons that we have sought to try to break this backlog of Corps of Engineers and other resiliency projects is because of the need to ensure our communities are adapting, to ensure our coastal communities are safe. As we have discussed in this committee before, you can take the coastal counties, parishes, and boroughs around the United States, they only constitute 10 percent, just 10 percent of the actual land area, yet over 40 percent of the population lives there. We cannot allow for this slow and expensive process to continue to thwart our efforts to become the more resilient Nation that we should be, that continues to thwart our ability to adapt to the changes that we are seeing.

Just recently, we offered an amendment to the appropriations bill for Energy and Water trying to facilitate this process of reevaluating the Corps of Engineers' efforts, and how in the world we got to $100 billion backlog while Presidents from Clinton forward have requested less than $2 billion in construction funds. And we were thwarted in that effort to try to change, to try to move this mission up and make it a priority by this very Congress. The same people that are sitting here talking about how we need to adapt, we need to be resilient, effectively or affirming, affirming this both slow and expensive process that has prevented our Nation from making the proactive investments that we need to make.

I do want to highlight that within the last 2 years, we have been able to make some progress, and that we have made some of the most substantial investments in resiliency that we have ever made in the United States. We have changed the definition of resilience or actually allowed for the definition of resilience to actually be established whenever we have disasters, to come back and actually build smarter, not build back the same way. Build higher, build stronger, providing for more adaptation, providing for more flexibility under our Disaster Recovery and Reform Act, under our Stafford Act amendments that we did in October of last year.

So, Madam Chair, one, look, I agree 100 percent that we have got to be a resilient Nation, but we have to have the tools, we have to have the processes in place that recognize the urgency of the challenges that we are facing today.

My home State of Louisiana, we have lost 2,000 square miles of our coast. The reason Arkansas doesn't evacuate when hurricanes come is because they have a buffer. It is called Louisiana. Our buffer is gone. Our buffer is gone. And that is why in 2005, when you saw Hurricane Katrina hit our coast, it became a quick wakeup call for many people, recognizing that the loss of our coast is not a habitat problem for birds and fish. It is an economic problem. It is a historic preservation problem. It is a problem for economic development. It is a problem for homes and businesses, one of the most

pervasive problems you can possibly explain or experience. James Carville, a New Orleans resident, described it as a war. And you know what? He is right.

So, Madam Chair, I look forward to working with you to ensure that we can develop a government response or perhaps proactive approach to resiliency that our Nation deserves.

I yield back.

Ms. CASTOR. Thank you very much.

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

Now I want to welcome our witnesses. Paula DiPerna is a special advisor at CDP. Through CDP, more than 500 U.S. companies disclose information about their environmental performance. Ms. DiPerna previously served as a vice president for the Chicago Climate Exchange and led the Joyce Foundation.

Garvin Jabusch is the chief investment officer and co-founder of Green Alpha Advisors, a financial services firm focused on sustainable, fossil-free investment strategies. Prior to Green Alpha Advisors, Mr. Jabusch served in many roles in the financial industry, including as vice president of strategic services at Morgan Stanley.

Jay Walker is the executive vice president of commercial lending at South Louisiana Bank. Mr. Walker is also the president of the Morganza Action Coalition, which advocates for the authorization and funding of the Morganza-to-the-Gulf Hurricane Protection System.

Francis Bouchard is the head of sustainability at Zurich Insurance Group, one of the world's 100 largest companies. Zurich has run a global flood insurance program since 2013.

Without objection, the witnesses' written statements will be made a part of the record.

With that, Ms. DiPerna, you are now recognized to give a 5-minute presentation.

STATEMENTS OF PAULA DIPERNA, SPECIAL ADVISOR, CDP NORTH AMERICA; GARVIN JABUSCH, CHIEF INVESTMENT OFFICER, GREEN ALPHA ADVISORS, LLC; JAY WALKER, EXECUTIVE VICE PRESIDENT, SOUTH LOUISIANA BANK; AND FRANCIS BOUCHARD, GROUP HEAD OF PUBLIC AFFAIRS AND SUSTAINABILITY, ZURICH INSURANCE GROUP

STATEMENT OF PAULA DIPERNA

Ms. DIPERNA. Thank you very much.

Thank you for the opportunity to testify and for your service to our country. I also want to thank Chairman Castor, especially for her leadership of the committee; Ranking Member Graves for that very insightful statement; and Speaker Pelosi for convening the committee. I know well her commitment to addressing climate change dating back at least to 2007 when she led a vanguard effort to create a zero emissions target for these very buildings in the House.

Now we come together again, and perhaps we feel a bit like the rabbit in Alice in Wonderland, running around with a clock and being late, late, late for a very important date, a date we all have with our destiny to recognize the climate change challenge for what

it is, the greatest impetus in a generation to create jobs, retool, reset, and modernize our economy and protect our people.

A few words on CDP which operates as a public good. Launched in 2003 as the Carbon Disclosure Project, we pioneered the idea of specific environmental disclosure to shareholders. Today, as you have just heard, we have roughly 650 companies in the U.S. and Canada disclosing to us voluntarily, 70 percent of the S&P 500, and about 500 signatory investors representing most of the world's financial service sector who use CDP as a reference on corporate environmental performance and investment decisions.

Our annual request is global, qualitative, and quantitative, aligned with the recommendations of the Task Force on Climate-Related Disclosure, and to an extent, we model ourselves on the SEC EDGAR system for 10-K filings. In fact, we are a standardized, one-stop shopping information platform on the doability and the desirability of addressing climate change, and we are unique in the world.

A word about me. My CV is in the record, but suffice it to say that I am proud to say I have seen climate change from 360 degrees, from coral reefs to carbon markets, literally.

On the subject of today's hearing, climate resilience and business views, this month, CDP issued a comprehensive report on the two things that the chairwoman just referenced: risks and opportunities.

On risks, of the world's 500 largest companies, 215 companies representing $17 trillion in market cap did reference near term financial risks from climate change at nearly $1 trillion, with over half of those risks reported as likely, very likely, or virtually certain to materialize in 5 years or earlier. Of those 215 companies, 81 are based here in the United States.

On the opportunities side, on the other hand, the opportunities seem to outsize the risks, with 225 of the world's 500 biggest companies reporting potential upsides, totaling nearly $2 trillion. Of these 225, 89 are based in the United States. And I can answer questions about the forces involved in those numbers.

Notably, on the opportunities side, companies headquartered in the United States among the largest 500 reported less than half the potential opportunities than their EU counterparts. And it is possible that the policy framework evolving in the EU, which is consistent with the Paris Agreement, that global regime that you referenced, Mr. Graves, supports an opportunity viewpoint by offering reasonable regulatory certainty conducive to investment.

As to how risks are expressed by companies themselves, the following are just a few examples, with additional examples in my written testimony and in our repository. Harris Corporation, Jacksonville, Florida close to 7,000 employees see risks for their data centers, reduction in operational efficiency and increased component failure rates as increases in average temperatures and associated humidity will affect baseline design parameters, end of quote.

Conagra, with headquarters in Chicago, in our forest disclosure said, quote, our paper suppliers are impacted by U.S. flooding caused by extreme weather and exacerbated by climate change, and forest fires exacerbated by drought that have appeared with increasing frequency over the past few years.

Yum! Brands based in Louisville, Kentucky, with 38,000 employees and operating 48,000 restaurants in the world, 145 companies they say, says, quote, climate change influences could negatively impact production, including extreme weather events, changes in precipitation and temperature, forest fires, loss of ecosystem services, reduce crop yields, and thus, availability of certified sustainable material, which is already limited.

Eli Lilly based in Indianapolis said, quote, changing precipitation patterns, droughts, flooding, and tropical cyclones could potentially damage our manufacturing research and development. Our principle active ingredient manufacturing occurs in our U.S., Ireland, and Puerto Rico sites. Puerto Rico, where we employ 1,400 people, was devastated by Hurricane Maria.

I will stop here just to bring back later our reference to Matchmaker, which has a tremendous listing of climate resilient projects, 108 costed projects just in the States represented by this committee, ranging from the Embarcadero Seawall in Saint Louis to $23 million in Gretna, Louisiana.

I will be very happy to answer any questions. Thank you.

[The statement of Ms. DiPerna follows:]

Written Statement of Paula DiPerna, Special Advisor, CDP, 25 July 2019

Thank you for the opportunity to testify before you today, and I congratulate the vision of Speaker Pelosi and Chairwoman Castor to convene the Select Committee. I've had first-hand experience with the Speaker's commitment to addressing climate change, dating back to 2007 when she led a vanguard effort to create a zero emissions target for the House office buildings, and to do so, the U.S. House of Representatives became a member of the also vanguard Chicago Climate Exchange at the time, where I as Executive Vice President.

Now, nearly a decade later, we come together again to address the complexities of climate change, surely one of the most vexing operational, socio-economic and policy issues before us, inescapable across all sectors and all constituencies. No doubt the disclosure repository of CDP, launched originally in 2003 as the Carbon Disclosure Project, and the first international system to gather environmental performance disclosure, contains information relevant to not only each state represented here on the Committee, but all 50 states, and I thank you for your service to the nation.

CDP disclosure is both qualitative and quantitative, and we send our standardized annual request for disclosure to most of the publicly trading companies in the world, covering climate change, water and forests issues. No other system like ours exists elsewhere. We make all our information available to the public, operate as a public good and to an extent model ourselves on the SEC EDGAR system for 10K filings. Our annual request is signed by roughly 550 institutional investors, asset owners and wealth managers—our signatories—who represent most of the financial services sector of the world. They use our disclosure as a reference on corporate environmental performance, strategic advantages and vulnerabilities, and a gauge for making investment decisions.

On climate change, today, roughly 650 companies in the U.S. or about 70% of the S&P 500 in the U.S. disclose to us and through us to our signatories, providing data on environmental performance, plans and imperatives.

CDP disclosure also information companies need to benchmark to their peers. Our system offers years of anecdotal and analytical information establishing both the doability and desirability of addressing climate change, expressed by companies themselves, and information about the cascade effects up and down the line to workers and average Americans who see climate change impacts up close.

In fact, perhaps there is no longer any such thing as a purely environmental problem. All environmental problems are now squarely socio-economic, and the climate crisis is absolutely inextricable from the socio-economics at work. For example, we've all heard of the recent research in the Federal Reserve's 2018 *Report on the Economic Well-Being of U.S. Households* that roughly 40% of adults would struggle to cover an unexpected expense of $400, either by borrowing, selling something or not covering it at all.

So, obviously, if a house is even modestly damaged by flooding, the family would be unable to replace essentials, such as furniture, or the washing machine in the basement. Climate change related extreme weather events compound the precariousness of cash-strapped families.

Climate change is, in sum, a here and now issue that will hurt the poor and disenfranchised most of all.

A word about me: My cv is part of my written testimony but suffice it to say here that I have seen the climate change issue from 360 degrees, from coral reefs to carbon markets, literally. And I know well the proud U.S. tradition of concern about climate change. In fact, I recently spoke with Dr. Warren Washington, a pioneer of climate modeling science, a long-standing researcher at the National Center on Atmospheric Research and recipient of National Medal of Science, who told me of his work advising six consecutive U.S. Presidents up until President Obama, all of whom had shown concern about the possibility of climate change. He mentioned especially President George H.W. Bush, who not only helped set up the nation's first dedicated climate change research programs, but who also signed the U.S. on to the original Framework Convention on Climate Change in 1992—I witnessed his pen crossing the paper, I should add.

This Convention, of course, provided the legal underpinning for the 2015 Paris agreement, currently the world's blueprint, which the U.S. Administration has now rejected, breaking ranks with our own history of thoughtful action, and leaving us alone on earth to stand outside the global consensus that climate change must be addressed, but also dampening the incentives that could help us reap at scale the extraordinary opportunities that are at hand as we redesign, retool, rebuild and refit almost all our critical infrastructure, generating jobs and helping the U.S. regain dominance of 21st century technological innovation and manufacturing. In fact, I sometimes feel like the rabbit in *Alice in Wonderland,* running around with a clock and running late, late, late for a very important date. A date we all have with our destiny to take leadership on the climate change question and recognize it for what it is—the greatest impetus in a generation to create jobs, re-set and modernize our economy and protect our people.

On the specific issue of today's hearing, climate resilience and business views, it is crystal clear that climate change has two basic faces: Risks and Opportunities. This month, CDP issued a comprehensive global disclosure report on both.

On RISKS: Of the world's 500 largest companies, 215 companies representing US$16.95 trillion in market cap reported estimated financial risks from climate change at ~US$970 billion), *nearly a trillion dollars,* with over half of those risks reported as likely/ very likely / or virtually certain to materialize in five years or earlier. Of these 215, 81 are based in the U.S.

The main drivers of this potential financial impact were:

1) Increased operating costs (due to higher compliance costs, increased insurance premiums etc.) at ~US$179 billion;

2) The write-off of assets or their early retirements because of potential damage to them / being in high-risk locations at ~US$170 billion;

3) Reduced demand for goods and / services due to a shift in consumer preferences totaling US$102 billion; and

4) Changes in policy leading to write-offs, asset impairment and early retirement of existing asset sets totaling ~US$73 billion.

On OPPORTUNITIES: On the other hand, opportunities derived from addressing climate change outsize the risks, with 225 of the world's 500 biggest companies reporting potential upside financial impacts totaling over *US$2.1 trillion dollars*, driven by potential increase in revenue due to demand for low emissions products and services, and meeting shifting consumer preferences. Of these 225, 89 are based in the US.

The main drivers of these opportunities were:

1) Increased revenue (through demand for low emissions products and services)—US$970 billion;

2) Better competitive position to reflect shifting consumer preferences—US$487 billion;

3) Increased revenue through new solutions to adaptation needs—US$236 billion;

4) Increased capital availability (as more investors favor low-emissions producers—US$198 billion.

In terms of opportunities, it is interesting to note that companies headquartered in the U.S. in the G500 group report less than half the potential opportunities as their counterparts headquartered in the EU. As we know, the EU is evolving a clear policy framework consistent with the Paris agreement, and it could be that this co-

herence supports a business opportunity viewpoint by offering reasonable regulatory certainty, conducive to investment.

As to how these risks and opportunities are expressed by companies themselves, I will provide you some examples from a range of state and company types.

CALIFORNIA RESOURCES CORPORATION, a company engaged in hydrocarbon exploration, sees "Risks in changes in precipitation patterns and extreme variability in weather patterns leading to increased operating costs (e.g., inadequate water supply for hydroelectric plants or to cool nuclear and fossil fuel plants)" and also says this impact could be worsened because "Due to the severe drought in California over the last several years, water districts and the state government are implementing regulations and policies that may restrict groundwater extraction and water usage and increase the cost of water."

EQUINIX, INC., which operates data centers in 52 metropolitan areas in 24 countries, says "The physical impacts of climate change, including extreme weather conditions such as heat waves, could materially increase our costs of operation due to, for example, an increase in our energy use in order to maintain the temperature and internal environment of our data centers necessary for our operations."

PG&E CORPORATION: As we all know, PG&E, which has 23,000 employees, has been forced into bankruptcy by the losses and potential claims against it related to the recent cataclysmic forest fires in Paradise, California whose devastation was compounded by drought and other factors. The bankruptcy affected not only the company, its customers and shareholders, but was also a blow to the transition to renewable energy since, PG&E had been a leading supplier of renewables and had itself recognized climate change risk. It has said "PG&E faces the risk of increased electricity demand and loads from its customers due to more extreme and prolonged hot weather events. Higher temperatures, including warmer daytime maximums and nighttime minimums, for prolonged periods, may also mean that certain electrical assets may fail, become less efficient or less reliable, and may need to be modified or replaced. Higher electrical loads increase stress and management of electricity on the transmission system. There is also the risk of increased PG&E customer outages during extreme heat wave events" as well as ". . . the risk of higher inundation and flooding potential at coastal and low elevation facilities due to sea level rise when combined with high tides, storm runoff, and storm surges. There is the risk of levee erosion or failure, putting assets at risk. PG&E also faces the risk of damage to substations and other gas and electric infrastructure."

Other utilities have also been negatively affected by the PG&E situation. After the fires, Standard and Poor's ratings stated "we lowered our credit rating on Edison International and its subsidiary Southern California Edison . . . and placed all of our ratings on the companies on CreditWatch with negative implications" which "reflects the increased likelihood that Edison will continue to experience catastrophic wildfires due to climate change." S&P similarly downgraded San Diego Gas and Electric Company, for the same reasons. Subsequently, Fitch Ratings also revised its rating outlook for Edison International, from stable to negative adding "Given the unprecedented size of recent wildfires, future multi-notch downgrades cannot be ruled out."

These credit ratings changes may seem far from the American people, but in fact they reflect a drain on financial stability and borrowing power of key employers and infrastructure providers, and can cut into the value of pension fund holdings, 401Ks, etc. causing indirect hardship and heartbreak for ordinary Americans beyond even those who suffer loss of life and property.

SEMPRA ENERGY is a North American energy infrastructure company based in San Diego, California that has said, "damages from the 2007 wildfires exceeded SDG&E's [Sempra parent company] liability insurance coverage, ultimately leading to a $351 million charge in 2017."

WELLS FARGO with approximately 265,000 employees, says "Change in precipitation extremes and droughts can impact our customers. For example, droughts can drive up the cost of water and thereby affect our customers' ability to payback their loans, especially if they are in water intensive industries such as agriculture, semiconductors, energy, select tourism, breweries and beverage companies and more." Wells Fargo also said "Global agreements were established as a result of COP21; however there remains a lack of clear, consistent global and national regulations associated with climate change."

THE MOSAIC COMPANY is a Fortune 500 company based in Minnesota, the largest U.S. producer of potash and phosphate fertilizer, with facilities in Florida. It sees climate risks as chronic: "Changes in precipitation resulting in droughts or water shortages at our mines in Florida or Saskatchewan where we manage large volumes of water in our daily operations could restrict our operating activities, re-

quire us to make changes in our operating activities that would increase our operating costs, reduce our efficiency or limit our output."

HARRIS CORPORATION, based in Jacksonville, Florida, with close to 17,000 employees, identifies increased severity of extreme weather events such as storms, cyclones and flood risks as a current and direct risk to its operations. Their disclosure states "For data centers, reduction in operational efficiency and increased component failure rates as increases in average temperatures and associated humidity will affect baseline design parameters. For example, the loss of ambient cooling potential. Changes in humidity may also lead to changes in patterns and rates of equipment corrosion. Higher humidity levels may also lead to new requirements to maintain internal environments within system tolerance ranges, as excess condensation can cause short-circuiting or water ingress."

Harris also said it will, "expand the scope of events we consider in our planning to include more frequent and unusually disruptive storms in these locations, as well as the impacts of increased/more severe winter storms on our operations in the Midwest and Northeast."

ARCHER DANIELS MIDLAND, based in Illinois, employs 31,000 employees serving customers in more than 170 countries. ADM can foresee potential loss of revenue " "if facilities are unable to acquire enough raw material to operate" due to "increased severity of extreme weather events" and ensuing impacts. It also says, that "the price of raw materials would increase, transportation via river would become difficult, and operations could be limited or halted."

CONAGRA, with headquarters in Chicago, has said "Rising mean temperatures [leads to] reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)."

In our Forests disclosure, CONAGRA also has said "Our paper suppliers are impacted by U.S. flooding caused by extreme weather and exacerbated by climate change, and forest fires exacerbated by drought that have appeared with increasing frequency over the past few years."

YUM! BRANDS, based in Louisville, Kentucky, with 38,000 employees and operating 48,000 restaurants in 145 countries worldwide, said: ". . . Shortages or interruptions to our Concepts' restaurants could adversely affect the . . . operations of our restaurants. Such shortages or disruptions could be caused by inclement weather, natural disasters, or a variety of other issues. Climate change influences several physical rik drivers that could negatively impact production, including extreme weather events such as tropical cyclones and changes in precipitation and temperature, forest fires, loss of ecosystem services, reduced crop yields, and thus, availability of certified sustainable material, which is already limited."

EXELON CORPORATION, also based in Chicago and employing approximately 33,400 people worldwide with approximately 10 million customers in the US, has said it foresees risk as "Increased severe-weather events leading to increased capital costs (e.g., damage to facilities). Each utility plans for storm recovery costs in their annual operating budget, but costs can swing year to year by 10 to 100 million dollars (as incurred during Hurricane Sandy in 2012, and again in 2014 from February ice storms) depending on the significance of the storm event." In addition, Exelon says "Extreme weather conditions or damage resulting from storms could stress the Utility Registrants' transmission and distribution systems, communication systems and technology, resulting in increased maintenance and capital costs and limiting each company's ability to meet peak customer demand."

In the hospitality sector, *HYATT HOTELS* which employs approximately 45,000 people around the world, and another 70,000 through third-party owners and franchise partners, has described multiple risks, including "Rising mean temperatures . . . that could result in increased cooling demands and associated costs at our hotels. Wide-spread increases in energy demand may also increase the cost of utilities for our hotels." In addition, "Hyatt's coastal properties may need to make capital investments in systems to mitigate the effects of sea level rise, such as structural reinforcement and improved drainage systems. Sea level rise would also compound the risks of tropical cyclones and flooding mentioned above for Hyatt's coastal properties, which could impact business continuity and increase capital costs needed for repairs. Sea level rise could also impact the desirability of particular locations or travel patterns of customers."

In the real estate sector, *JONES LANG LASALLE INCORPORATED* is the second-largest company of its kind in the world, with operations in over 80 countries and a global workforce of 82,000. On climate risks, the company says "We expect insurance companies to raise premiums generally as the result of projected increase in extreme weather events resulting from the increase in *global temperatures.*" Also, "The occurrence of natural disasters can significantly increase the availability and/or cost of commercial insurance policies covering real estate, both for our own busi-

ness and for those clients whose properties we manage and who may purchase their insurance through the insurance buying programs we make available to them. For LaSalle Investment Management, changes to weather patterns leading to increasing precipitation pose an indirect risk through rising insurance premiums as actuaries start to integrate climate change into their pricing models. These costs would normally be passed on but there is a risk they could impact the value of the asset."

ELI LILLY, with headquarters in Indianapolis, Indiana has said, "Changing precipitation patterns, droughts, flooding and tropical cyclones could potentially damage our manufacturing, research and development, and our housing/distribution facilities and those of our key suppliers, especially in flood prone areas . . . In 2017, our operations in Mexico, U.S. and Puerto Rico were hit by a string of devastating earthquakes and hurricanes. Our principal active ingredient manufacturing occurs at our U.S., Ireland, and Puerto Rico sites. Puerto Rico, where we employ 1,400, was devastated by Hurricane Maria in 2017, causing power outages, food and water shortages."

And the CDP repository has many years of similar descriptions from companies, and since all companies are employers, these and other risks described, all touch people.

But there is also an upside concerning people and the ongoing drive for jobs creation. The International Labour Organization (ILO) forecasts that "24 million new posts will be created globally by 2030," with the caveat that, "the right policies to promote a greener economy must also be in place for this to happen, along with better social safety nets for workers."

To take just one significant company, in Maryland, Lockheed Martin Corporation, which has more than 590 facilities in 50 U.S. states and employs approximately 100,000 people worldwide, identified in our disclosure the use of lower-emission energy sources as a $21 billion opportunity, which in turn presumably could generate significant new employment.

And just for perspective, while of course the use of artificial intelligence and the IT revolution have cut into jobs creation, on the other hand, "green jobs" exist across the spectrum of work that needs to be done. I helped spearhead an entity called the Jobs and Environment Initiative back in 2006 to survey the landscape then of what are overly simply called "green jobs," in a range of states in the U.S. and, for example we found in Florida, environmental demands were generating more jobs for sheet metal workers than geoscientists, in Ohio, more jobs for welders than biochemists, and so forth.

Regarding business expectation and preparedness for policy, there is significant evidence of wide-open eyes. Take, for example, the question of whether and how to "put a price on carbon"—meaning either a tax or cap-and-trade or combination.

As of our tally two years ago, 96 companies disclosed that they had already set an internal carbon price for the purpose of internal planning, indicating that they accept and understand that greenhouse gas emissions carry a hidden cost to their business which they seek to make visible using a projected surrogate cost, an internal carbon price. An additional 245 companies stated they are likely to be using an internal carbon price by the end of this year's disclosure cycle. And many companies using this internal mechanism indicate they do so because they wish to be better prepared for eventual regulation and/or are operating in a jurisdiction where they already face mandatory requirements, such as in the EU or in China.

Among the companies using an internal carbon price is Oklahoma Gas and Electric, which employs 2,500 people and serves more than 800,000 electricity customers. Citing opportunities ahead, OG&E disclosed that it "has leveraged its advantageous geographic position to develop renewable energy resources and completed transmission investments to deliver the renewable energy. The Southwest Power Pool (SPP) has begun to consider and authorize the construction of transmission lines capable of bringing renewable energy out of the wind resource area in western Oklahoma, the Texas Panhandle and western Kansas to load centers by planning for more transmission to be built in these areas."

Also of interest but less discussed, given the links between drought and water availability, and anticipated scarcities in predictable water supply, 89 companies have also begun using *internal water prices* to better gauge rising costs and risk, as of our 2018 Water Disclosure request.

And on the question of climate science, far from denying climate science, there is essentially no debate about it among any thoughtful business leaders. In fact, climate science could be said to be a new business language, given the growth in companies setting science based targets (SBTs) for greenhouse gas emissions reduction, meaning targets in line with the terms of the Paris agreement. As of the end of 2018, 150 companies disclosed they had or were in the process of setting SBTs, up from 128 companies in 2017 and 88 in 2016.

Regarding trends in capital investment, mainstream investors are also recognizing the significant upside of shifting capital to companies that take environmental and social factors into strategic account in their business management. According to the Sustainable Investment Forum of the US, for example, which tracks relevant data, today 1 in 4 dollars invested in the U.S. is screened for environmental, social or governance factors (esg), or 26% of the approximately $46 trillion US-based assets under management. That is up from 1 in 6 dollars in 2019 and 1 in 9 dollars in 2012.

And, in a basic core indication of how integrated low carbon efficiency has become, the S&P 500 Carbon Efficient Index, which overweights carbon efficient companies and underweights carbon intensive companies, is now tracking virtually to a T with the venerable classic S&P 500, an alignment that indicates if nothing else that valuations are not reduced if low carbon intensity and energy efficiency are prioritized. On the contrary.

But despite progress, returning to the science, we see that the clock is ticking on reversing the most dangerous climate change trends, as greenhouse gas emissions continue to rise due to a variety of interlocking factors. So looking ahead to solutions and meeting new demands and needs, it could be worthwhile to think of what I call the three I's—indemnification, insurance and infrastructure.

First, indemnification. Currently the risks of climate change are bouncing around the economy like a wayward pawn on a chessboard looking for a place to land. They are not hitting the general economy yet because they are not priced in yet—but costs there are, and they are being borne either by the government and taxpayers, through FEMA and other social safety net programs, already stretched thin; insurance companies,; or the victims themselves, who have no recourse, either because they are cash-strapped, under-insured, or just plain unable to respond to catastrophic extremes.

So perhaps new forms of indemnification will be needed to absorb risks and insulate at least the individual victims.

This leads to insurance.

The Committee will be hearing from Zurich Re, of course. But for additional relevance, according to a July 2018 overview report on climate risk by the Sustainable Insurance Forum and the International Association of Insurance Supervisors:

On *insurance market risk,* the report says: "From a pricing risk perspective, insurers' capacity to write insurance business may be constrained by increasing physical risks to insured property and assets, if risk-based pricing rises beyond demand elasticity and customer willingness to pay. There is evidence that domestic property in high risk areas is being rendered uninsurable due to high exposure to physical risks, such as wildfires, storms and sea level rise. In the United States, US$600bn of property within one mile of the coast is covered under the National Flood Insurance Programme, much of which will not be viable in coming decades, absent intensive adaptation investments."

And on *investment risk:* "The profitability of insurer investment portfolios may be affected if invested in sectors or assets which may be especially at risk from either physical or transition-related factors. This could, at the extreme, constrain insurers' capacity to pay future claims."

Also, regarding insurance and risks, according to the 2018 Annual report from global insurance broker, AON, entitled *Weather, Climate and Catastrophe Insight,* in 2018: "64% global insured losses from natural disasters came from the United States; the years 2017 and 2018 were the costliest back-to-back years for weather disasters on record globally, with an economic impact of US$653 billion, and the costliest for private and public insurers on record at $237 billion.:

Moreover, of the $225 billion economic cost of natural disasters in 2018, $215 billion were weather related.

And finally infrastructure. We all know that America's infrastructure is crumbling and in urgent need of modernization. To undertake what is needed will require decades of capital investment, but we also know that any dollar invested in infrastructure improvements pays dividends for years to come.

This is especially obvious as we celebrate the 50th anniversary of the Apollo 11 landing, one of the most fantastic accomplishments in our nation's history. The space program gave us much more than Tang—it built the communications systems that became the internet and gave the U.S. such an edge in digital technologies. And consider the compounding benefits of investments in the U.S. highway system, much of which also needs climate resilience updating, by the way.

There is room for an ambitious and comprehensive focus on not only modernizing infrastructure but designing and planning it with climate change trends in mind. Climate change resiliency means strengthened security—if we build it, we will have it when we need it. And a focus on climate change as an infrastructure opportunity,

rather than an existential threat, can mobilize and galvanize the American people across the nation.

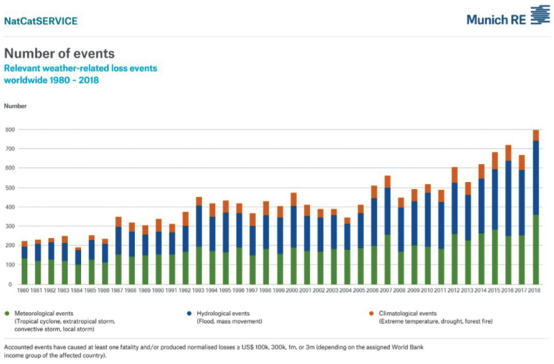
In fact, there are climate resilience infrastructure needs big and small vividly waiting to be met all around the nation. Through our CDP Cities program, we operate the Matchmaker portal where cities can showcase to investors their climate resilience related infrastructure needs, most of which have direct benefit where people live and work. Currently, in the states represented on the Committee alone, we have 158 projects currently needing funding, of which 108 have preliminary cost estimates totaling roughly $10 billion in projected cost, ranging from the multi major Embarcadero Seawall renewal project in San Francisco, to smaller flood and mitigation projects needed valued at $23 million in Gretna, Louisiana. Globally, there are about 650 costed Matchmaker projects seeking funding, half of which need funding of under $1 million.

When it comes to infrastructure we all have our horror stories. In my own experience, one day earlier this month, not only did Amtrak come to a halt because of a fire in the rail tunnel now crossing the Hudson River—the walls were still so hot after the all-clear, they looked like the inside of a toaster as our train limped through. A few days later, flights from Reagan international were delayed for hours due to overheated airplanes, too hot to board, we were told, because of high external temperatures on the ground that prevented normal cool down after a flight. The airline company had to wheel in a portable unit to pump cool air into the cabin, a contraption that looked like a giant vacuum cleaner in reverse. Anomaly, maybe, but more likely a harbinger of what is to come as we try to match our wits and technology to the exigencies of a changing climate. Perhaps there is even room for a Climate Resilience Infrastructure Act?

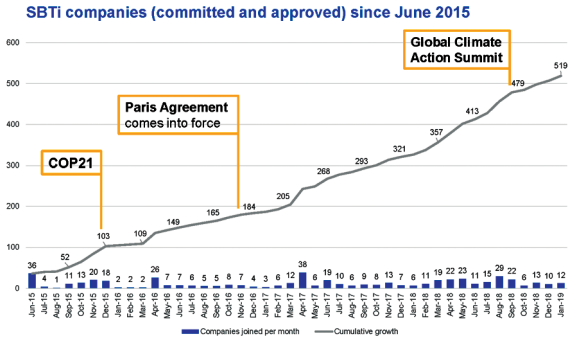
In sum climate change is present and costly to companies and average Americans, and coherent inter-sectoral policies would make the U.S. less vulnerable. Thank you and I will be glad to answer any questions.

VISUALS FOR CDP/PDIPERNA TESTIMONY, U.S. HOUSE OF REPRESENTATIVES, SELECT COMMITTEE ON THE CLIMATE CRISIS—25 JULY 2019

Natural Catastrophes on Rise



Growth of Companies Setting Science-Based Targets

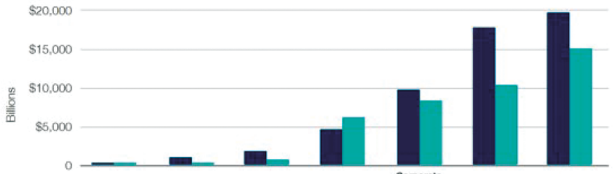


555 companies have committed to setting SBTs – up from 320 companies in January 2018

Do not circulate or reproduce without permission from PDiPerna, paula.diperna@cdp.net

Global ESG Investing: Steadily Rising

FIGURE 6: GLOBAL GROWTH OF SUSTAINABLE INVESTING STRATEGIES 2016–2018

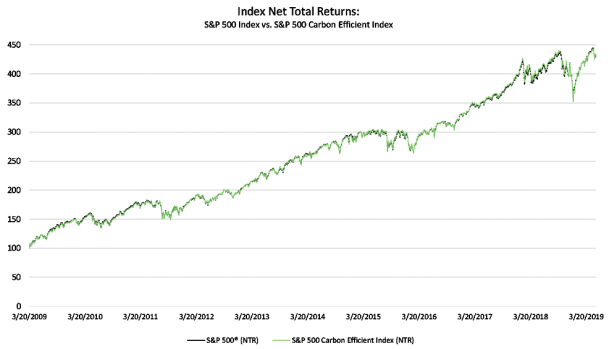


	Impact/ community investing	Sustainability themed investing	Positive/ best-in-class-screening	Norms-based screening	Corporate engagement and shareholder action	ESG integration	Negative/ exclusionary screening
2018	$444.26	$1,017.66	$1,841.87	$4,679.44	$9,834.59	$17,543.81	$19,770.96
2016	$248.47	$276.16	$818.01	$6,195.40	$8,385.17	$10,353.20	$15,063.57
Growth 2016–18	79%	269%	125%	-24%	17%	69%	31%
CAGR	33.7%	92.0%	50.1%	-13.1%	8.3%	30.2%	14.6%

Note: Asset values are expressed in billions.
Some corrections to the 2016 strategies have been made. See the Methodology section for more information. 2018 GLOBAL SUSTAINABLE INVESTMENT REVIEW

S&P 500 Index Closely Tracks S&P 500 Carbon Efficient Index

S&P 500 Index vs. S&P 500 Carbon Efficient Index



S&P Dow Jones Indices
A Division of S&P Global

NOTE: The graph shows the S&P 500 Index and S&P 500® Carbon Efficient Index (Net Total Return, daily performance) over a 10 year period. The index performance data was re-based as of the index series' base date (20/03/2009), and spans to 21/05/2019.

REFERENCES FOR CDP/PDIPERNA TESTIMONY, U.S. HOUSE OF REPRESENTATIVES, SELECT COMMITTEE ON THE CLIMATE CRISIS—25 JULY 2019

Report on the Economic Well-Being of U.S. Households in 2018, Board of Governors of the Federal Reserve System, 2019 https://www.federalreserve.gov/publications/files/2018-report-economic-well-being-us-households-201905.pdf

Are companies ready for climate change? (Global Analysis), CDP, 2019 https://www.cdp.net/en/research/global-reports/global-climate-change-report-2018/climate-report-risks-and-opportunities

CDP 2018–2017 Annual Disclosure Information requests. https://www.cdp.net/en/responses

San Diego Gas & Electric Co. Downgraded to 'BBB+', Outlook Remains Negative S&P Global Ratings, January 21, 2019

Fitch Affirms Edison International and SCE; Rating Outlook Revised to Negative Fitch Ratings, January 22, 2019

World Employment and Social Outlook 2018: Greening with jobs International Labour Office—Geneva: ILO, 2018

Jobs Creation in the Environmental Industry in the U.S. and Nine States, 2006 Management Information Systems, Inc. www.misi-net.com

Putting a price on carbon: Integrating climate risk into business planning, CDP, October 2017 https://www.cdp.net/en/climate/carbon-pricing

2018 Report on U.S. Sustainable, Responsible and Impact Investing, US SIF Foundation, 2018

Issues Paper on Climate Change Risks to the Insurance Sector, International Association of Insurance Supervisors (IAIS), 2018 https://www.insurancejournal.com/research/research/success/climate-change-risks-to-the-insurance-sector/

Weather, Climate & Catastrophe Insight: 2018 Annual Report, Aon, 2018 http://thoughtleadership.aonbenfield.com/Documents/20190122-ab-if-annual-weather-climate-report-2018.pdf

CDP North America: Matchmaker, CDP, https://www.cdp.net/en/cities/matchmaker

Ms. CASTOR. Terrific. Thank you.

Mr. Jabusch, you are recognized for 5 minutes.

STATEMENT OF GARVIN JABUSCH

Mr. JABUSCH. Thank you.

And I would like to add my thanks, Chair Castor, Ranking Member Graves, for the opportunity to testify today.

Climate disruption and resource degradation both present significant threats and opportunities for American business. We know that. Every industry is affected, and since my business of asset management deploys capital across the economy, it is exposed to all these risks and opportunities inclusively.

So risks. In investing, the purpose of it is to preserve and grow our purchasing power. There are volumes of portfolios today written about how to do this. And those theories have worked well for decades, but many theories of the world work great until the world changes. Now the change is climate disruption. And in the exercise of fiduciary duty, I have to think about the effects the climate crisis will have on every business I consider placing my client's assets into. And inversely, I have to think about the effect each business may have upon the climate. In doing this analysis, I minimize risk and can grow my clients' purchasing power into the future.

Now the application of this is simple; it is in realizing that science is our path to knowing things, and science tells us that many of our present economic activities, like fossil fuel development, like internal combustion engines, use of topsoil to put in chemicals have to decline dramatically and soon. So the prudent fiduciary knows that holding securities of companies pursuing these activities will put client assets at risk, regardless of the time horizon, as madam chair has noted in her opening remarks.

According to experts like former Bank of England governor Mark Carney and investor Jeremy Grantham and, again, as Chair Castor mentions, the Fed itself, climate has emerged as, bar none, the most important risk in asset management, and so the main threat to investments today is in holding the causes of the climate crisis. De-risking a portfolio therefore means not owning key threats to that economic stability.

So those are the risks within my industry. The main risk to the climate that comes from my industry is that the dominant way of investing today flat ignores the climate crisis, indexing. A cnbc.com article explains that, quote, 80 percent of the stock market is now on autopilot, end quote. That means, today, the reason the stock is bought usually is because it is in an index, not because of what the company makes or service it provides. This is dangerous because the major indexes are packed with causes of our risks. The S&P 500 alone includes about 60 fossil fuels related companies and any number of risks to water, to topsoil, to economic equality to name a few.

So let's be clear. If you own the S&P 500 today, you think you are investing passively, but you are not. You are making an active bet on the causes of system-level collapse. By your actions, if not your intent, you are signaling that you hope to benefit from causing climate disruption. The climate crisis is the most important risk to capital preservation, yet the main risk coming from the investment industry is that the majority of professionals are ignoring that, and worse, investing in its causes.

There are those in investments working to change this, my firm among them. It sounds simple to invest for a sustainable economy, but investment managers haven't had great principles yet to guide them. So our approach to de-risking portfolios is to select stocks, not because of their presence in an index, but because of what a company does. We think the clearest line of sight there is to look at source of revenues, simply. Is a company being paid to help de-risk the economy or does it get paid to help drive it towards the edge? If a company's net activities do not mitigate risk on an ongoing basis, we shouldn't own it.

Investing has to get back to judging individual cases on their merits, and we can use disinterested objective principles to make better choices. You get the economy you invest in, and while most investors still own the S&P 500, we will be living in a fossil fuels economy that it represents.

All right. Those are risks from my industry and how to avoid them, but what about opportunities. Well, this is where there is good news, and it is that innovation is increasing, and the rate of that increase is itself accelerating. So innovation just means doing things better. It means more efficient economic production, getting more output from fewer inputs. As E.O. Wilson has noted, and I note that he was here on the Hill a couple of days ago talking, digitalization is key to achieving sustainability, because growing efficiency of production shrinks our ecological footprint. And we now have the means to mitigate climate disruption, means from fields from advanced materials in biotech, to renewable energy in storage, to zero emissions transport, and adaptations like indoor agriculture. Investing in solutions like these will drive performance at

the portfolio level as these innovators gain market share from legacy predecessors.

So economic production can and will be much greater than it is today, while consuming far fewer inputs like natural resources, dollars, and person hours, and with fewer externalities. This will create enormous wealth and result in a sustainable economy, meaning we can realize good standards of living for the 100 percent without overtopping Earth's capacity. The greatest opportunity to grow wealth is in investing for that endgame. That endgame is a zero-risk economy.

Thank you.

[The statement of Mr. Jabusch follows:]

Creating a Climate Resilient America: Business Views on the Costs of the Climate Crisis

The Select Committee on the Climate Crisis

Testimony of Garvin Jabusch, Chief Investment Officer, Green Alpha Advisors, LLC

Thursday, July 25, 2019

I. Climate disruption and resource degradation present significant threats to and opportunities for American business. Every sector and industry are affected, and my industry of asset management, in its role deploying capital across the economy, is directly exposed to it all, risks and opportunities inclusive.

II. First, risks. The purpose of investing is to preserve and grow one's purchasing power. Whatever amount I am investing, I want to be able to buy as much or more with its value in the future than I could have with its cash value today. There are volumes of portfolio theory about how to achieve this, and, overall, those theories have worked well for decades. But many theories of the world work great, until the world changes. Now, the change is climate disruption, and in the full exercise of fiduciary responsibility as an asset manager, I have to think hard about the effects that climate disruption will have on every business I consider placing my clients' assets into, and inversely, the effect each business may have upon the climate. It is in doing this analysis, no longer optional for the prudent risk manager, that I can minimize investment risk and grow my clients' purchasing power into the future.

What is the practical application of this? It begins with the realization that even within asset management, it is science that is our path to knowing things. Science tells us that many of our present economic activities, such as fossil fuel development, internal combustion engine manufacture, fossil powered electricity generation, and use of topsoil depleting chemicals, have to decline dramatically, and soon. Thus, the prudent fiduciary knows that holding the securities of companies pursuing these activities is likely to put his or her client assets at risk, particularly in the medium and long terms.

According to experts such as former BoE governor Mark Carney and noted investor Jeremy Grantham, climate has emerged as bar none the most important risk in asset management, and the main threat to investments today is in holding the causes of the climate crisis. To de-risk a portfolio, it is necessary to not own the primary threats undermining economic stability.

III. Those are the risks within my industry. The main risk to the climate coming from my industry is that the predominant way of investing today completely ignores the climate crisis. A recent cnbc.com article explains that "80% of the stock market is now on autopilot . . . Passive investments control about 60% of the equity assets, while quantitative funds—using trend-following models instead of fundamental research—account for 20% of market share." This means that today, the main reason a stock is bought is because it is in an index, and not because of what the company makes or what services it provides. This is dangerous because the major indices are riddled with the causes of our largest environmental and therefore economic risks. The S&P 500 includes approximately 60 fossil fuels related companies and any number of other risks to water, topsoil and economic equality, to mention a few. Let me be clear: if you own the S&P 500 today, you may believe you are investing passively, but you are not. You are making an active bet on the causes of system-level

collapse. By your actions, if not your intent, you are signaling that you hope to benefit from causing climate disruption and resource degradation. Climate is the most important risk to capital preservation, yet the main overall risk coming from the investment industry is that the vast majority of professionals and their clients are flat ignoring it.

IV. There are those in investment management working to change this, my firm Green Alpha Advisors, among them. It sounds simple to invest for a more sustainable economy, but the problem has been that investment managers don't have good principles to guide them. Green Alpha's approach to de-risking portfolios has been to select stocks not because of their presence in a benchmark index, but because of what the company actually does. We believe the best way to begin, and the clearest line of sight, is to look at sources of revenues. Is a company being paid to de-risk the global economy, or is it being paid to help drive it towards the edge? Are the majority of revenues coming from business activities that will help society mitigate or adapt to the climate crisis, or from causing it?

Rather than blindly indexing, investment professionals have to get back to judging individual cases on their merits; and we can use disinterested, objective principles to make better choices. If a company's net activities do not create a better world on an ongoing basis, we should wonder why we own it. You get the economy you invest in, and as long as most investors still own the S&P 500, we are going to be living in the fossil fuels economy that it represents.

V. Those are the risks in and from my industry, and how to avoid them. What about the opportunities? This is the good news, and I think it is generally underappreciated.

Human innovation is increasing in an unprecedented way, and the rate of that increase itself is accelerating. Faster and faster, we're coming into possession of the means to both mitigate climate disruption, and to adapt to what we have already committed ourselves to. Why? Because innovation means doing things better. It means, as it always has meant, making economic production more efficient: getting more output out of ever fewer inputs. As biologist Edward O. Wilson has noted, the digitalization of the economy is key to achieving environmental sustainability, because the associated expanding efficiency of production can shrink our ecological footprint. But of course indefinite sustainability isn't emerging only from digitalization, we are also today seeing great strides in advanced materials, biotech, renewable energy and storage, zero emissions transportation, water management, and in key adaptations like indoor agriculture. Investing in these efficiency solutions will lead to competitive performance returns as these innovators continue to gain market share from their legacy economy predecessors, and thus grow faster.

VI. Economic production can be much greater than it is today while consuming far fewer inputs, be those inputs natural resources, person hours or dollars, and can do so with far fewer externalities like greenhouse gasses and other pollution. This will create enormous wealth for investors, and will also put us on the path to indefinite sustainability, meaning we can realize a good standard of living for everyone—the 100%—without overtopping earth's tolerances. The greatest wealth preservation and growth opportunities for my firm come from that; from keeping our eye on, and investing for, that endgame: namely, a zero-risk economy.

Ms. CASTOR. Thank you.

Mr. Walker, you are recognized for 5 minutes.

STATEMENT OF JAY WALKER

Mr. WALKER. Thank you, Chairwoman Castor, Ranking Member Graves, and committee members. My name is Jay Walker. I am from Houma, Louisiana, and I am the EVP and chief of lending at South Louisiana Bank, a community bank in Terrebonne Parish in Louisiana. It is an honor and a privilege to be here with you here today to discuss creating a climate resilient America.

In the last three decades, my banking community have experienced 13 named storms. The latest, Hurricane Barry, was less than 2 weeks ago. Both my bank and my community long ago decided to pull up our bootstraps and do whatever it takes to build resiliency and to continue to make our living in south Louisiana.

It is important for members to know that Louisiana is a working coast, and those of us who live in coastal Louisiana do largely in

service of our Nation's energy and seafood needs. While diverse, our community's economy is driven by these two industries, and moving is simply not an option.

For the people of south Louisiana, being resilient in the face of climate change and other challenges is a way of life. We have been doing it for decades. There is a hope for communities and businesses that pull together and take action to prepare and protect themselves from the inevitable process of climate change, erosion, subsidence and other challenges.

In spite of these challenges, my bank has maintained a loan loss reserve of 2.5 times higher and a capital of 31 percent greater than our peers. I am not telling you this to brag but to point out that when you live and operate in an environment with increased risk, you have to maintain resiliency to make it through the tough times.

While my day-to-day job is to provide our region's banking needs, I am also very active in the community, and those efforts are intertwined. My community survival is tied to managing risk from a manipulated delta and a channelized Mississippi River. Efforts to aid the Nation's waterborne commerce have had a severe impact on our community. Namely, subsidence, sinking wetlands. Since 1992, the communities in Terrebonne and Lafourche Parishes have been the subject of Federal studies to build levee protection projects in order to protect our citizens from the risk of hurricanes.

The levee protection project called the Morganza to the Gulf is a 98-mile hurricane protection levee system. This project has been before Congress four times since 2000, and was finally authorized for construction in the 2014 WRRDA at a cost of $10.3 billion. But to date, we have received no Federal funding.

In 2006, the Morganza Action Coalition was formed to advocate for the Federal funding to complete the levee protection project. I am currently the president of MAC, and my bank has contributed over $70,000 to MAC support advocacy to build large-scale levee protection.

This 501(c)(4) nonprofit's efforts have been critical to moving our Federal partner, largely to get out of the way of local efforts, but to date, virtually all of our protection has been constructed from local and State revenues to the tune of over $400 million. Our community, with the State's support and local dedicated taxes, has partially built more than 45 miles of levees, and 9 floodgates.

Let me say it again. After years of waiting for Federal funding, our communities both in Terrebonne and Lafourche Parishes voted to tax themselves to begin building this system. The most recent tax vote for an additional half cent in Terrebonne Parish passed in December 2012 by a 72 percent voter margin. We have taxed ourselves more than any other coastal community in America to reduce risk largely caused by Federal actions.

Just 2 weeks ago, a Cat 1 hurricane named Barry barreled through the Gulf of Mexico, on a similar path to hurricanes Rita in 2005 and Ike in 2008. But the difference this time was that less than 15 homes flooded in Terrebonne Parish versus 1,100 for Rita and upwards of over 10,000 that flooded in Ike. In south Lafourche where the levee system is even more complete no homes flooded.

It is imperative that our coastal communities complete this levee protection project to protect us from up to a Cat 3 hurricane. The most recent U.S. Corps of Engineers study evaluating the cost of the Morganza to the Gulf levee, which used actual cost data from completed sections, indicates that more accurate cost to complete the project is estimated to be $3.4 billion, one-third of the original $10.3 billion estimate. We believe our $400 million-plus spent on flood protection so far has probably saved at least that much in flood damages for Hurricane Barry, a single storm.

In a couple of months, Congress will be looking at long-term solutions for the National Flood Insurance Program. Think of the savings that the communities of Terrebonne and Lafourche Parish would have had on mitigating of flood claims from the completion of our levee system. The Morganza to the Gulf levee protection project is an investment that the citizens of my community have made to build resiliency to climate crisis.

Is there a cost? Yes. But the cost of not building and preparing are much greater. I encourage Congress to step up and invest in building the Morganza to the Gulf levee protection project and others like it which, in the end, will save taxpayers billions of dollars.

Thank you for allowing me to be with you today, and I will be glad to answer any questions.

[The statement of Mr. Walker follows:]

Statement of Mr. Jay Walker, Executive Vice President, South Louisiana Bank, Houma, LA

On "Creating A Climate Resilient America; Business Views on the Costs of the Climate Crisis"

U.S. House of Representatives, Select Committee on the Climate Crisis—July 25, 2019

Chairwoman Castor, Ranking Member Graves and Committee Members, my name is Jay Walker, and I am from Houma, Louisiana. I am the Executive Vice President, and Chief of Lending at South Louisiana Bank; a community bank of just under $500 Million in assets, with our home office located in Terrebonne Parish, Louisiana. My bank serves the markets of Terrebonne and Lafourche Parishes in Southeast Louisiana. It is an honor and privilege to be here with you today and discuss "Creating a Climate Resilient America".

I started my banking career in 1983, just as my community was hit with the worst oilfield industry downturn in U.S. history. Faced with dire straits, my management team came up with a plan to work through the tough times and we survived. In the last three decades, my bank and community, has experienced many storms, some natural, and some man-made. You may remember the names of a few of them; Hurricanes Juan, Andrew, Lily, Isadore, Katrina, Rita, Gustav, Ike, and just two weeks ago Hurricane Barry. Then in 2010, my area was hit with a virtual shutdown of the oil industry as the previous administration imposed an offshore deep-water drilling moratorium. Both my bank, and my community, have decided to pull up our boot straps and do what it would take to build resiliency, and continue to make our living in South Louisiana.

It is important for Members to know that Louisiana is a working coast and those of us who live in coastal Louisiana do so largely in service to our Nation's energy and seafood needs. While diverse, our community's economy is driven by these two industries and moving is simply not an option.

In Terrebonne and Lafourche Parishes, we are home to one of the nation's most active deep-water oil ports, helping to fuel our nation. And home to where over 21% of all fisheries landings in the lower 48 states is produced. And home to a thriving tourism business with arguably the best sport fishing in North America. What I can tell you is that for the people of Southeast Louisiana, being resilient in the face of the climate and other challenges is a way of life. We have been doing it for decades. Also what I'm here to tell you, is there is hope for communities and businesses that

pull together and take action to prepare, and protect themselves from the inevitable process of loss from climate change, erosion, subsidence, and other man caused challenges.

My bank, despite all of the previously mentioned challenges, has maintained a loan loss reserve of 2.5 times higher than our peers, and capital at 31% greater than our peers. I'm not telling you this to brag, but to point out that when you live and operate in an environment with increased risk, you have to maintain resiliency to make it through the tough times!

While my day-to-day job is to provide our region's banking needs, I am also very active in the community. And those efforts are intertwined. My community's survival is tied to managing risk from a manipulated delta and channelized Mississippi River. Efforts to aid the Nation's waterborne commerce have had a severe impact on our community. Namely, subsidence—sinking wetlands. Since 1992, the communities in Terrebonne and Lafourche Parishes have been the subject of federal studies to build levee protection projects in order to protect our citizens from the risks of Hurricanes. The levee protection project called "Morganza to the Gulf", is a 98-mile hurricane protection levee system that has been before Congress four times since 2000. It was finally authorized for construction in the 2014 Water Resources Reform & Development Act, at a cost of $10.3 billion. But to date we have received no Federal funding!

In 2006, a 501(c)4 nonprofit organization, called the Morganza Action Coalition (MAC) was formed to advocate for Federal funding to complete the levee protection project. I am currently the President of MAC, and over the past several years, my bank has contributed over $70,000 to MAC to support the advocacy to build large-scale levee protection.

MAC's efforts have been critical to moving our Federal partner. Largely to get out of the way of local efforts, but to date, virtually all of our protection has been constructed from local and state revenues, to the tune of over $400 million. Our community, with state support and local dedicated taxes, has built more than 45 miles of levees, partially built to the first lift of 10–12 feet high, and 9 flood gates. Let me say it again, after years of waiting for Federal funding, our communities, both in Terrebonne and Lafourche Parishes voted to tax themselves to begin building the system. The most recent tax vote for an additional ½ cent in Terrebonne Parish passed in December, 2012 by a 72% voter margin to continue this effort. We have taxed ourselves more than any other coastal community in America to reduce risk largely caused by Federal actions!

So, does becoming climate resilient have a cost? Sure it does. My bank's stockholders waited many years to be paid dividends on their investments, all while the bank was building capital and reserves. Only now to reap the benefits of consistent above average earnings and dividends. And so too will the residents of my community reap the benefits by building resiliency in our community by protecting its residents from the potential damage from hurricanes. Just two weeks ago a category 1 hurricane named "Barry" barreled through the Gulf of Mexico on a similar path to hurricanes Rita, in 2005, and Ike, in 2008. But the difference this time was that less than 15 homes flooded in Terrebonne Parish, versus over 1,100 for Rita, and upwards of 10,000 that flooded in Ike. And in South Lafourche, where the levee system is even more complete, no homes flooded.

It is imperative that our coastal communities complete this levee protection project, designed when completed to a height of 18 feet, to protect us from up to a category 3 hurricane. The most recent study evaluating the cost of the Morganza to the Gulf levee project by the U.S. Army Corps of Engineers, using actual cost data from completed sections, has indicated that a more accurate cost estimate is estimated to be $3.4 billion to complete the project; a reduction in cost of over two thirds from the original $10.3 billion. The total coastwise cost of damages from hurricane Rita was $10.5 billion in 2005, and damage from Ike was $30 billion in 2008. We believe our over $400 million spent on flood protection so far, could have saved upwards of $500 million in flood damages from a single storm, Barry.

In a couple of months, Congress will be looking at a long-term solution to the National Flood Insurance Program. Think what kind of savings the communities of Terrebonne and Lafourche would have on the mitigating of flood claims from completed levee systems? The Morganza to the Gulf levee protection project is an investment that the citizens of my community have made to build resiliency to the climate crisis. Is there a cost? Yes, but the cost of NOT building, and preparing are much greater. I encourage Congress to step up and invest in building the Morganza to the Gulf levee protection project, which in the end will save taxpayers billions of dollars.

Thank you again for allowing me the opportunity to speak to you today. I will be happy to answer any questions.

Important dates and events in the history of promoting the authorization and funding of the Morganza to the Gulf Hurricane Protection Project:

- 1986—South Terrebonne Tidewater Management & Conservation District was created (now TLCD)
- 1986–1990—Local Investigation of Hurricane Protection System begins with USACE suggesting Comprehensive Study and EIS
- 1992—USACE led Reconnaissance Study begins (MTG was initiated—20 years ago)
- 1992—Hurricane Andrew floods project area
- 1995—USACE begins Feasibility Study with 50/50 cost share with the State
- 1998—USACE instructed to begin advance design of the HNC Lock (PL 105–62)
- 2000—Morganza to the Gulf receives Authorization in Water Resources and Development Act (WRDA) contingent upon a signed Chief's Report by December 2000 (December deadline not met by USACE)
- 2001—Local sales tax passes and currently generates approximately $6 Million per year for construction of Morganza
- 2001—Tropical Storm Allyson floods project area
- 2002—USACE Feasibility Report completed and submitted to Congress for action
- 2002—Morganza Project Cost updated for WRDA by USACE
- 2003—Hurricane Lili and Tropical Storm Bill flood the project area
- 2004—No WRDA Bill passes; Project Cost updated again by USACE; however, Reach J–1 of Morganza is authorized by Congress
- 2005—Hurricanes Katrina and Rita flood project area
- 2006—Again, Project Cost is updated for WRDA
- 2006—Construction of Reach J–1 initiated with $18 Million State and Local dollars, beginning state and local efforts for construction of Morganza-to-the-Gulf
- 2007—Project Cost updated for WRDA by USACE
- September 2007—Morganza is authorized for construction
- December 2007— USACE informs the local sponsor that the Project Cost has exceeded the authorized limit and Morganza must be reevaluated.
- February 2008—USACE stops environmental and design work on HNC Lock pending completion of the reevaluation.
- June 2008—State of Louisiana dedicates $98 Million to Morganza, combined with other local funding totaling $130 Million for Morganza construction, Non-federal dollars
- September 2008—Hurricanes Gustav and Ike flood the project area
- 2009—Construction begins on Reach H–3 for $7.2 Million State funding
- August 2009—August, USACE Post-Authorization Change Study begins and is scheduled for completion in December 2012
- 2009—Present—TLCD commences construction and/or permitting for Reaches H–2, H–1, G–1, G–2, J–2, J–3, E, F, Bush Canal Floodgate, Placid Canal Floodgate, Bayou Grand Caillou Floodgate, HNC Floodgate all with Non-federal dollars
- December 2012—Voters in Terrebonne Parish overwhelming approve an additional half-cent sales tax for local completion of the first lift of levees and floodgates along the Morganza alignment.
- May 2013—U.S. Senate approves 2013 WRDA bill, including re-authorization of Morganza-to-the-Gulf at $10.3 billion.
- May 2013—U.S. Army Corps of Engineers Senior Review Panel releases the project's final draft Post-Authorization Change (PAC) Report for federal and state agency comment.
- July 11, 2013—USACE signs off on Chief's Report for the Morganza-to-the-Gulf Hurricane Protection Project. A 120-day mandated review period by the Assistant Secretary of the Army for Civil Works and the Office of Management and Budget begins.
- December 9, 2013—Record of Decision released, signaling final approval of project by the Obama Administration.
- May 22, 2014—U.S. Congress authorizes the federal Morganza-to-the-Gulf Hurricane Protection Project as part of the Water Resources Reform and Development Act (WRRDA) of 2014.

A map of the Morganza-to-the-Gulf Hurricane Protection System is available at http://www.morganza.org/morganza-to-the-gulf-description/.

Ms. CASTOR. Thank you very much.

Mr. Bouchard, you are recognized for 5 minutes.

STATEMENT OF FRANCIS BOUCHARD

Mr. BOUCHARD. Good afternoon, and thank you for this opportunity to testify. My name is Francis Bouchard, and I am the head of public affairs and sustainability for Zurich Insurance Group.

Zurich is the leading direct insurer that has been serving customers around the world for nearly 150 years, including over 100 years in the U.S. As a risk management expert, we have identified climate change as perhaps the most complex risk base in society. It is intergenerational, it is international, and it is interdependent. We concur with the IPCC findings, and it is our aim to leverage our sector's role in society to help deepen awareness of climate risks and to incentivize the behaviors and best practices that will be required to mitigate against and adapt to the worst impacts of climate change. As an insurer, this effort is core to our mission. And as a responsible steward of the planet, it is simply the right thing to do.

It is clear that the frequency of extreme weather events is increasing. NOAA captures this trend well in its analysis of billion-dollar weather-related disasters, with the 3-year average of 15 such events per year far exceeding the 30-year average of 6.2 events per year. Perhaps even more alarming, though, is the growing gap between overall economic losses and insured losses, both in the developing world and in the U.S., a phenomena insurers call the protection gap.

The committee has asked witnesses to address the costs of climate change to businesses. In our view, those costs come in two primary forms, physical risks and transition risks, both of which present complex risk management challenges. This is why we view the disclosure regime, such as the one developed by the Financial Stability Board, to be constructive first steps for boards, management teams, and investors to improve risk-aware decisionmaking.

As for managing our own physical and transition risk, Zurich is taking concrete steps. We became carbon neutral in 2014, decreasing our own CO2 emissions per employee by 50 percent from our 2007 operations, recently committing to use 100 percent renewable energy across our global operations. We also set targets to reduce the use of internal paper by 80 percent and eliminate the use of single-use plastics.

In reality, though, insurers are relatively small emitters of carbon. So our ultimate impact will be achieved through our marketplace role, both as an institutional investor and as an insurer of risks. As an investor, we proactively evaluate ESG factors in our investment decisionmaking process, with over 87 percent of our in-scope investments already meeting or exceeding our minimum standards. We are also major impact investors, and by year-end 2018, had invested $3.8 billion, avoiding 3.5 million tons of CO2 and benefiting 2.4 million people.

Like other economic sectors, it is still quite early in the evolution of a climate-focused insurance market. That said, we have products that encourage better or even less driving, cover electric vehicles, and offer build back better options. We developed the first dedi-

cated carbon capture and sequestration liability offering, increased our renewable energy sector business, and are bolstering our modeling capabilities to support clients who are seeking to deepen their own understanding of climate exposures.

As market demands evolve, then, insurers are developing products and services that will help facilitate or even incentivize longer term resilient behaviors. In some cases, though, we feel the need to accelerate those trends, which is why Zurich recently announced a new policy to engage in risk-based dialogs over a 2-year period with customers or those companies we invest in that have significant commercial operations in thermal, coal, oil sands and oil shales. The aim is to drive a deeper conversation regarding their mid- to long-term transition plans for reducing the carbon intensity of their operations.

The insurance mechanism has a clear role to play in helping society manage climate risk. However, a model that prices risk over a 12-month period, no matter how sophisticated the methodology, will struggle to fully reflect longer term evolving exposures like climate change. In those cases, insurers must find new ways to play their role in society that go well beyond the traditional products and services they provide. That is why Zurich and other insurers have undertaken a series of knowledge-based initiatives to work with other societal actors to apply the analytics of insurance to a much broader group of stakeholders.

In 2013, as the chairwoman referenced, we launched our Global Flood Alliance. And with NGO and academic partners, we deployed a sophisticated resilience framework in over 100 at-risk communities and have now expanded the program to broaden our impact even further.

Today, 87 percent of disaster-related funding goes to post-event recovery. And it is our goal to demonstrate both the humanitarian and economic benefits of shifting more funding to pre-event preparation.

Another approach we take to sharing our knowledge about resilience is through the publication of PERC reports that assess human-induced elements of what are typically considered natural disasters, with the research revealing several important truths as outlined in my written statement.

Finally, we are proud of our affiliation with SBP, a national resiliency nonprofit located in New Orleans, which has evolved into a true system level thought leader on disaster preparedness and recovery, particularly for the most vulnerable at-risk populations.

In closing, let me acknowledge that the precise costs of climate change are difficult to calculate and are subject to unknown future scenarios. That should not inhibit business from acting, though, which is why we are proud of the role that insurers are playing to help society prepare for and address the costs associated with climate change. At Zurich, we take that responsibility seriously and are eager to work with others who share that commitment.

Thank you.

[The statement of Mr. Bouchard follows:]

Written Testimony of Francis Bouchard, Group Head of Public Affairs and Sustainability, Zurich Insurance Group

"Creating a Climate Resilient America: Business Views on the Costs of the Climate Crisis"

House Select Committee on the Climate Crisis—July 25, 2019

Good afternoon. I would like to thank the Chair of the Committee, Congresswoman Castor, as well as Ranking Member Graves and other members of the committee for the opportunity to testify before the Select Committee. My name is Francis Bouchard and I am the head of Public Affairs and Sustainability for Zurich Insurance Group.

I plan to break my testimony into four main sections: a broad overview of how insurers view climate risk, how Zurich is addressing the issue of climate within our own operations, how we incorporate climate and environmental, social and governance (ESG) thinking into our market activities, and how we engage with society more broadly to help advance risk-sensitive climate-aware decision-making.

Before I start though, let me introduce the company I work for. Zurich is a leading multi-line direct insurer that has been serving its customers in global and local markets for nearly 150 years. With about 54,000 employees, it provides a wide range of property and casualty, and life insurance products and services in more than 210 countries and territories. Zurich's customers include individuals, small businesses, and mid-sized and large companies, as well as multinational corporations.

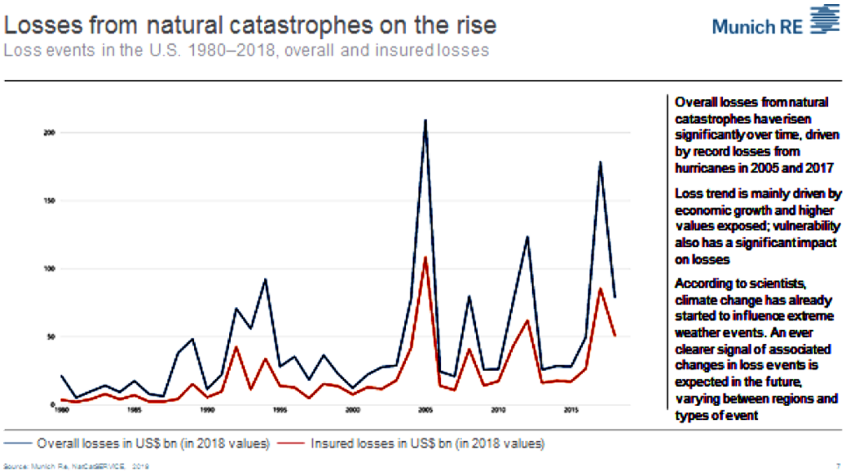
For over a century, Zurich North America has called the greater Chicago area home. In 2016, Zurich moved its U.S. corporate campus a few blocks north in suburban Schaumburg, Illinois to an award-winning headquarters that has earned LEED Platinum® certification, the highest rating from the U.S. Green Building Council. The distinctive design underscores our commitment to resilience, collaboration and innovation. The headquarters became the largest LEED Platinum®-certified structure of its kind in the United States and the only one of its kind in Illinois. On the one-year anniversary of Zurich's headquarters, we reported a 30% reduction in water and electricity consumption compared with our previous location.

Using our core risk assessment skills to respond to some of the most significant long-term societal and environmental trends, we have identified climate change as perhaps the most complex risk facing society today. It is inter-generational, it is international and it is interdependent. Representing the consensus of the international scientific community, the Intergovernmental Panel on Climate Change (IPCC) finds strong evidence that climate change is occurring, that it is influenced by human action, and that it is leading to changes in extreme weather and climate events.

Zurich shares this belief that climate change is real, influenced by human actions and impacting weather patterns. It is our aim to leverage our sector's role as the primary risk signaler for society to help deepen awareness of the risks climate change poses, and ultimately to incentivize the behaviors and best practices that will be required to both mitigate the worst impacts of climate change and adapt to changing weather patterns. We do this because Zurich's mission is to protect individuals, businesses and communities, and because we believe it's the right thing to do.

Furthermore, we do this because the impact of extreme weather events is escalating. The National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information captures this trend well in its analysis of billion-dollar weather-related disasters, with the three-year average of 15 such events per year far exceeding the 30-year average of 6.2 events per year (https://www.climate.gov/news-features/blogs/beyond-data/2018s-billion-dollar-disasters-context).

Perhaps even more alarming, though, the gap between overall economic losses and insured losses due to natural catastrophes is growing, not just in the developing world but in the United States as well. As this chart from Munich Re illustrates, both economic and insured losses have been steadily growing over the past three decades, with scientific forecasts suggesting the trend will accelerate and likely worsen. This "protection gap" is a significant cost of climate change to governments and communities, and it is the reason policymakers should focus on pre-event resilience, knowledge sharing and risk-informed decision-making. To be clear, insurers are not only focused on the risks they insure, but are committed to securing more resilient communities for all stakeholders.



RISK MANAGEMENT OF CLIMATE EXPOSURES

Broadly speaking, risk management responses to climate change fall into two categories: adaptation to the largely physical consequences of climate change; and mitigation of greenhouse gas (GHG) emissions and its associated transition risks.

If further impacts from a warming climate are to be avoided, the global economy needs to be transformed over the coming decades to reduce greenhouse gas (GHG) emissions. If not, then a further buildup of GHGs in the atmosphere will lead to a rise of average temperatures beyond the Paris Agreement's 2 C level, which, over time, will have increasing effect on severe weather event patterns, frequency and severity.

While the most severe physical changes of climate change are likely to take decades to manifest, they are largely irreversible in the long term. So, the challenge is to act now, to transform the global economy and largely decouple global economic growth from GHG emissions. At the same time, due to the lag effects of GHGs in the atmosphere, the world will need to continue to adapt to the physical effects of climate change for decades to come. The challenge, then, is to drive risk-informed climate-sensitive decision-making across all sectors.

In contrast to the physical risks, transition risks are those economic disruptions caused by changing customer sentiment, new technologies or public policy. They tend to impact sectors with a shorter timeframe and with less predictability. Therefore, it is critical that policymakers develop a clear and holistic approach to transition-relevant issues in order to take into account the unintended consequences of even the most well-meaning policy approaches.

Assessing the potential cost of these physical and transition risks is essential for communities and corporations. For business leaders, this process may yield benefits beyond shoring up supply chains, for a truly holistic review of environmental risks will reveal opportunities as well. It is crucial that companies develop a climate resilience adaptation strategy, defined in four key steps:

- identify the broad business and strategic risks;
- identify the critical exposures, vulnerabilities and hazards;
- develop a granular view of the risks involved including, for example, individual locations; and
- develop a mitigation and resilience strategy, involving—where appropriate—insurance.

The challenge for business leaders and policymakers is to create strategies that optimize the opportunities associated with climate change adaptation and mitigation. In some cases, this can be done by individual initiatives carried out by the private sector and public sector, but in most cases, it will require multistakeholder action. In a few cases, it will require new technologies, new industries or new business models to be developed with new approaches to managing risk.

The Financial Stability Board, the global standard-setting body responsible for financial stability, established a Task Force on Climate-related Financial Disclosures (TCFD) that has created a useful framework for companies to start to address the corporate governance, risk management, scenario-playing and measurement aspects

of either adapting to or mitigating the impact of climate change. The hope is that this approach, already adopted by 800 firms globally, will form the basis of information that investors and other stakeholders can act upon to target 'green' investment and policies to enable a transition to the low-carbon economy. This task is of course challenged by the definition of what is 'green' and what needs to be prioritized to deliver sustainable finance.

The TCFD is a good framework for disclosure of climate change impacts on a business, but we recognize that we are early in this process, and that it will take time to develop meaningful analysis of longer-term exposures under difficult-to-predict transition scenarios. That said, Zurich's research suggests that based on current disclosures and strategic responses companies' collective actions will not be sufficient to achieve the 2 degree goal of the COP 21 Paris Agreement.

Businesses have always had to change their strategies to respond to market conditions, but climate change is different in that the timescales of the most severe impacts are far beyond most strategic plans. In these circumstances, scenario planning as recommended by the TCFD is an appropriate way to deal with such future uncertainty. In fact, as evidenced in a multi-sector modeling exercise hosted last week by the Geneva Association, a global insurance think tank, meaningful disclosures can serve as the basis for collective action and cross-industry collaboration.

CLIMATE-PROOFING OUR OWN OPERATIONS

At Zurich, being a responsible and sustainable company is at the foundation of our business. It is the reason we have signed the UN Global Compact in 2011, the Principles for Sustainable Investment in 2012, the Principles for Sustainable Insurance in 2017, and most recently the Business Ambition for 1.5 degrees. Even more important than these public commitments however, are the steps we are taking to future-proof our own operations.

Zurich became carbon neutral as of 2014 through its ambitious internal carbon emissions reduction efforts and by offsetting remaining emissions. We have decreased our own CO2 emissions per employee by 50% percent, eliminating over 150,000 tons of CO2e (equivalent of removing 32,000 passenger vehicles per year from the road) from our operations since 2007.

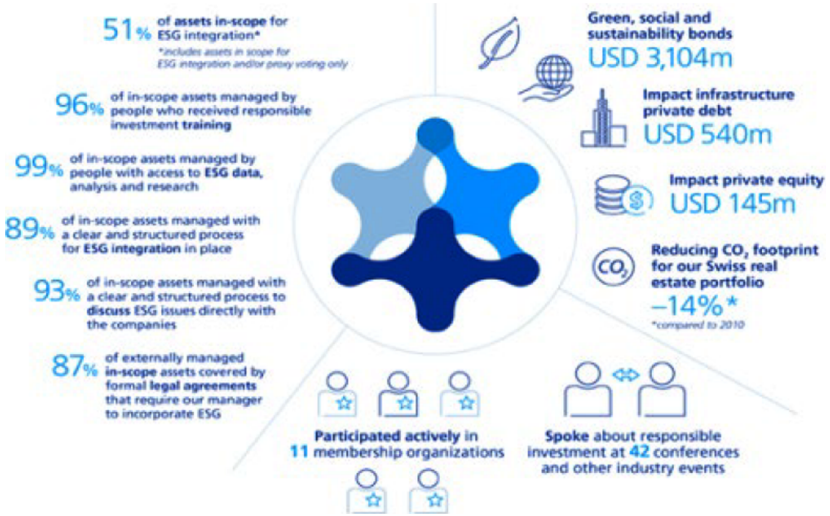
We are a member of RE100 (a global corporate leadership initiative committed to 100% renewable energy, www.there100.org) and have committed to utilize 100% renewable energy across all our global operations by the end of 2022. Additionally, we have set ambitious, near-term operational targets like the reduction of internal paper usage by 80% and the total elimination of single-use plastics by the end of 2019.

Reflecting the keen interest our people have in being part of the climate change solution, we have also initiated an internal training initiative aiming to educate at least 10,000 employees on the basics of the climate change challenge, as well as the role that the insurance mechanism can play in creating awareness of and incentives for solution-based thinking. In addition, we will soon be launching an internal platform that will allow our people to voluntarily offset their own carbon footprints while enhancing resilience in flood-ravaged regions.

MARKETPLACE IMPACT

In reality, though, insurers are relatively small emitters of carbon, so our ultimate impact will be achieved through our marketplace role, both as an institutional investor and an insurer of risks.

As an investor, we focus on both ESG integration and impact investing. We proactively evaluate ESG factors in our investment decision making process, both pricing risks and seizing opportunities in an award-winning approach. Currently, over 87% of our in-scope investments are meeting or exceeding our minimum standards on ESG integration and we are aiming to reach 100%. As part of this, we are embedding climate risk into our risk management processes, and are strengthening our technical and analytics capabilities for managing climate risk within our global investment portfolios.



We are also rapidly increasing our impact investments. In 2017, we announced our mid-range commitment to invest USD 5 billion in impact investments, avoiding 5 million tons of CO2e and benefiting 5 million people. By year-end 2018, we had already invested USD 3.8 billion avoiding 3.5 million tons of CO2e and benefiting 2.4 million people. We are not passive investors, however, and instead work with groups like the Principles for Responsible Investment (PRI), Global Impact Investing Network (GIIN), the Green Bond Principles (GBP) and others to help define the standards that will mainstream ESG investing. In this way, we have also been instrumental in the rapid development of the green bond market over the past six years.

On the product and market side, like other economic sectors it is still quite early in the evolution of a climate-focused insurance market. Many insurers have developed products utilizing technology to encourage better or even less driving, thereby reducing carbon emissions. Many, Zurich included, have dedicated policies for electric vehicles, and offer "build back better" options that achieve higher resilience standards. In terms of new technologies, Zurich developed the first dedicated carbon-capture and sequestration offering, and has systematically increased its solar and renewable energy business. In addition, it is methodically enhancing its modelling capabilities in order to support clients who are increasingly seeking to deepen their understanding of climate exposures. In short, as customer awareness grows and business models evolve, insurers are developing products and services that will help facilitate or even incentivize longer-term resilient behaviors.

In some cases, though, we feel the need to accelerate those trends and seek to deploy a risk-based engagement strategy to some of the more fundamental challenges posed by climate change. That is why Zurich recently took an important step aimed at helping to reduce the use of carbon-intensive fossil fuels by expanding its existing thermal coal policy to include fuels produced from oil sands and oil shales.

At the core of this new policy is Zurich's commitment to engage in risk-based dialogues over a two-year period with customers or those companies we invite in that have significant commercial operations in thermal coal, oil sands and oil shales. The aim is to drive a deeper conversation regarding their credible mid-to-long-term transition plans for reducing the carbon intensity of their operations.

Depending on the outcomes of its dialogues, Zurich has pledged to no longer underwrite or invest in companies that:

- generate more than 30% of their revenue from mining thermal coal, or produce more than 20 million tons of thermal coal per year;
- generate more than 30% of their electricity from coal;
- are in the process of developing any new coal mining or coal power infrastructure;
- generate at least 30% of their revenue directly from the extraction of oil from oil sands;

- are purpose-built (or "dedicated") transportation infrastructure operator for oil sands products, including pipelines and railway transportation;
- generate more than 30% of their revenue from mining oil shale; or
- generate more than 30% of their electricity from oil shale.

Our intent is to help drive a deeper conversation regarding mid-to-long-term transition plans for reducing the use of these fuel sources and their impacts on the global environment. In this same vein, Zurich has also committed to developing science-based targets that will hopefully help encourage a smoother transition in the sectors that we underwrite and invest in.

A BROADER SOCIETAL IMPACT

The insurance mechanism has a clear role to play in deepening awareness of climate risks and incentivizing the economic and behavioral models to address those risks. However, keep in mind that the primary mechanism by which it sends risk signals is the price of an insurance policy. It is this price—conveyed through a simple dollar term—that reflects the massive amounts of historic data collection, modeling, diversification and risk assessment that insurers undertake. That policy, though, is typically for a duration of 12 months, which allows both insurer and insured to reassess their exposures and reprice the policy. That model typically works well for immediate well-known exposures, but less so for risks that will manifest over a 30-year period, like climate change.

In those cases, insurers must find new ways to play their role as society's risk assessors that go well beyond the traditional products and services they provide. That is why Zurich and other insurers have undertaken a series of initiatives to work with other societal actors to apply the analytics of insurance to a much broader set of stakeholders.

For example, in 2013 Zurich launched its Global Flood Alliance, a multi-sector partnership focusing on finding practical ways to help communities strengthen their resilience to floods. Together with our Alliance partners, which included the International Federation of Red Cross & Red Crescent Societies, Practical Action, the Wharton School and the International Institute for Applied Systems Analysis, we not only developed a unique Flood Resilience Measurement Framework, including a toolbox to actively measure flood resilience, but we also applied the framework to over 110 communities in nine countries around the world, generating over 1.1 million data points.

With this framework, we plan to close the gap acknowledged by the UN: that currently no empirically verified measurement framework for disaster resilience yet exists. We do this by applying the measurement framework through our partners and program countries, thereby establishing the baseline of community resilience at the inception and measuring how sources of resilience develop over time as interventions are implemented. In addition, to validate the framework and ensure our sources or proxies of resilience do actually have an impact and build resilience, we measure outcomes of resilience should flooding occur in the program communities.

Building on the success of our first five years, we have widened the context of the Alliance over the last 24 months and are now working with further implementing partners, including: Concern Worldwide (Haiti, Afghanistan), Mercy Corps (Indonesia, Nepal, Timor-Leste), the National Academy of Sciences (Charleston SC and Cedar Rapids IA) and Plan International (Nepal). In this second five-year phase of the program Alliance members aim to increase third-party investments dedicated to pre-event resilience by $1 billion. We seek do this by rolling out best-practice community programs that demonstrate the value of resilience-building, compiling best practices and success stories, and advocating for more investment in resilience with authorities and public and private funders.

From our perspective prevention and resilience-building are not just about humanitarianism, they are about more effective use of scarce funds. Our research of the cost-benefit analysis from dozens of specific flood resilience programs has determined that there is, on average, a 1-to-5 cost/benefit ratio, underlining not only that resilience building is the proper approach to reducing human misery, but that it is responsible budgeting as well. However, currently around 87% of all disaster-related funding is targeted "post-event". Our aim with Zurich's Flood Resilience Program and its multi-sectoral Alliance is to demonstrate the effectiveness of investing in pre-event resilience building and shift global funding from recovery to resilience.

Another approach we take to sharing our knowledge about resilience is through the publication of award-winning Post-Event Review Capabilities, or PERCs, that assess human-induced elements of what are typically considered "natural" disasters, including the resilience of people, supply chains, systems, legal and cultural norms before, during and after a disaster. We have conducted 14 such reports covering ex-

treme weather events in Germany, the UK and Switzerland, as well as in North Carolina and Houston. In fact, we are currently in the process of conducting new studies of the wildfires in California.

Zurich's PERC analyses of global disasters leave no doubt that disaster risk management professionals all face several universal truths when it comes to attitudes and actions around preparing for and responding to natural hazards.

The research clearly demonstrates that:

- Disaster risk management is playing catch-up to an increasingly larger exposure to natural hazards.
- Globally, spending on climate-related response is far greater than investment in pre-emptive risk reduction strategies.
- Where money is invested on weather-related prevention, it typically goes to protecting physical structures rather than more cost-effective risk management such as environmental planning.
- Infrastructure protection already in place—levees, for example—can produce a false sense of security.
- Few incentives exist to encourage "building back better" and including resilience into the rebuilding process.
- The neediest in society are often neglected before and after disasters, and sometimes are still recovering from one event when the next one strikes.

Several of the studies reviewed the science on the increasing frequency and severity of climate hazards, especially extreme precipitation and storm surges. Future climate scenarios were presented in PERC studies on European floods, and across all the studies it was clear that in order to achieve a certain level of protection simply relying on historical data is not enough. Hazards are changing rapidly and planning must take this into account.

The studies also show that societies can be vulnerable to repeated events and may still be recovering from one when the next one strikes. That was North Carolina's experience with Hurricane Matthew in 2016 and Hurricane Florence two years later.

Rather than relying too heavily on disaster response, the PERC studies show that a better approach involves preventing the build-up of assets in high-hazard areas. The studies revealed, however, that there is little evidence that disaster risk is considered in most investment decision-making and land-use planning that could result in an accumulation of assets. For example, the PERC analysis of 2014 flooding in Nepal revealed that the risk of increased flooding from a planned hydropower plant had not been taken into consideration. In Germany, where flash floods caused heavy damage in 2016, the country experienced difficulties in controlling building in unmapped flood hazard zones.

North Carolina did use its experience with Hurricane Matthew to better prepare for the impacts of Florence two years later. Changes were implemented at state and local levels in interagency coordination, staging of key resources and an increased awareness of the need to prepare for recovery prior to an event. For example, the Food Bank of Eastern and Central North Carolina prepped branches and stocked local partners not just along the coast, but across the state in anticipation of inland flooding, which they hadn't done ahead of Matthew.

Businesses, large and small, are urged to stress employee preparedness at home as well as on the job to ensure that they remain safe and are able to continue working remotely if possible. Raising employee awareness a day or two prior to an event by asking about stockpiles of food, backup power or lodging and the security of key documents can potentially lower losses and hasten a return to work.

The PERC methodology was specifically designed to turn the lessons learned from the consequences of disasters into actions that help businesses and communities become more resilient and recover quickly from devastating events. It is not enough to understand the dynamics of disaster risk and resilience, including what went wrong and what worked well, but that is the necessary first step.

We encourage all interested parties to apply the methodology and contribute to the repository of freely available material on success and insights from around the world. PERC studies and a manual that serves as a guide for conducting PERCs are available at https://www.zurich.com/en/corporate-responsibility/flood-resilience/learning-from-post-flood-events.

We are also working with our primary U.S. trade association, the American Property Casualty Insurance Association, to provide helpful data-driven analysis to advocate for public policy solutions that are most likely to reduce catastrophe losses and provide more ready-made solutions for increasingly resiliency.

Another resilience initiative we are proud of is our affiliation with SBP, a national non-profit based in New Orleans. Initially established to rebuild homes following Hurricane Katrina, SBP has evolved into such a high-impact knowledgeable force

in post-disaster environments that it is now sharing its building techniques with other non-profits, advising local governments on optimizing federal funding programs and advocating for innovative approaches to disaster resilience. Perhaps its most impactful effort, though, will be a new approach to resilience training for individuals and small businesses that could help avoid losses altogether. Most of the beneficiaries of SBP's efforts are not insured, but by driving system-level change it is pursuing its mission of reducing the time between disaster and recovery.

An initiative we are just embarking on is to assess whether we can partner with others to create enough scale in the carbon offset market to drive projects towards nature-based solutions (e.g. coastal wetlands) that offer both carbon storage/sequestration and disaster resilience elements. The Nature Conservancy has worked creatively with other insurers to establish such scalable projects, and Zurich is already engaged in a series of discussions exploring how to expand the creation of such multi-benefit projects.

A final industry initiative that is leveraging the insurance mechanism to enhance climate resilience in developing economies is the Insurance Development Forum. This public private partnership, led by leading insurers and reinsurers, the World Bank and the United Nations, is creating the technical, financial and regulatory capacity to facilitate the use of innovative insurance solutions at the sovereign and regional level. Initially targeting those nations most exposed to climate risks, the IDF is one of the implementing platforms for the G7/G20 climate resilience targets, including the goal of extending insurance to another 400 million people by 2022. They are also collaborating closely with the UK, German and other development agencies, as well as the Global Centre for Disaster Protection and the Global InsuResilience Partnership, to broaden the use of modelling, data analysis and risk transfer vehicles.

CLOSING

In closing, let me reinforce that the insurance sector has a fundamental role to play in helping society prepare for and address the costs associated with climate change. At Zurich, we take that responsibility seriously, whether through our own operations, our market-focused actions or our knowledge-based initiatives. We are proud of the leadership our sector is taking in driving awareness and action on this critical issue. Zurich is dedicated to continuing to play a leadership role in driving global sustainability, and we invite and encourage everyone to join us in this essential effort.

Thank you.

Ms. CASTOR. Thank you all very much.

At this time, I will recognize myself for 5 minutes for questions.

Ms. DiPerna, in the 2019 status report by the Task Force on Climate-Related Financial Disclosures, the majority of the respondents said their organizations considered climate-related issues to be a material risk today and over the near term. Climate change is costing companies now, not 50 years from now.

How are companies managing that risk and what actions are they taking to mitigate it? If there are obstacles and challenges the companies see that the Congress should address, what would you recommend?

Ms. DIPERNA. That is a long——

Ms. CASTOR. I know.

Ms. DIPERNA. We only have a few minutes. And I am not really in the position to recommend policy. But with regard to what is disclosed to us, certainly return on investment, companies are trying to manage these risks—so first of all, you can ask Mr. Bouchard from Zurich, you know, insurance is a very big topic, very relevant, what I call the three Is: insurance, indemnification, and infrastructure. So companies are looking at all three. How can we indemnify ourselves against the risk? Build in protections against physical risk, modernize equipment. They are seeing higher premiums.

But also, the return on investment data that we are getting from disclosure is really interesting, because most of the investments companies are making to address the risk either by avoiding it, eliminating it, or building an alternative product, the returns on those investments tend to come in sooner than expected and at a higher rate of return.

So I think what we are seeing is companies are very, very nimble, but it is true, as I said earlier, that these risks are—I won't use the word "material" myself, because it has a fiduciary meaning—but are significant and due to fall on somebody within the next 5 years.

And one thing—sorry.

Ms. CASTOR. Well, you mentioned that in the EU, they have appreciated regulatory certainty because they have maintained their commitment to the goals set out in the Paris climate accord, and that it is a little more iffy here. Can you address that?

Ms. DIPERNA. Yes. I think regulatory certainty—and I was just speaking with one of my colleagues earlier who spent some time at the National Academy of Sciences this week, where some of our data does show now that regulatory uncertainty is being registered as a risk. And I mentioned that one of the very largest utilities in the company has stipulated that it is sometimes more difficult to manage the uncertainty of regulation than the challenges of climate change.

But as we know, regulation shouldn't be seen, in my opinion, as a restriction. It is at the least a level playing field. And if you want to be competitive, you have to know what your competitors are doing. And the coherence of something like the Paris Agreement, even though it has its shortcomings, does provide everybody a report card on what other people are doing.

So if you want to make a capital investment, you want to be sure that it is not going to somehow be undermined in 2 years if there is a new policy or a higher tax rate or something you can't predict.

Ms. CASTOR. Thank you.

Ms. DIPERNA. Business hates unpredictability.

Ms. CASTOR. Mr. Bouchard, boy, we are just being socked by the cost of these extreme weather events now. In 2017, the U.S. faced the highest single total cost related to extreme weather events on record, totaling over $312 billion. In 2018, we saw the fourth highest extreme weather cost at $91 billion worldwide. 2017 and 2018 were the costliest back-to-back years for weather disasters ever recorded. People are on the front lines but insurers are on the front lines with them. Insured losses in 2017 totaled $100 billion in the United States alone. So what does this mean going forward for the average ratepayer?

And then you also talked about the important investor mission that our insurance companies have. And are they actively transitioning away from fossil fuel investments because they know the impact on the bottom line?

Mr. BOUCHARD. So first, your numbers are accurate, and that is what we are seeing as well. We are seeing the trend lines are clear and they are not reversing. We may have—I think we just saw numbers for the first half of this year meeting of actually a lower catastrophe year, which is great news, but over time, the numbers

you cite are absolutely accurate and are the same numbers that we are working with and trying to model as well.

In terms of what it means for ratepayers, it really depends on the risks that they face today. I mean, I try to make that case in the testimony, that sending risk signals in 12-month insurance policies when the risk, yes, it is escalated today, but the real escalation will happen over the next 5, 10, 15, 20 years, does not reflect the full escalation of the risk in today's rates. It will come.

And I do think we are seeing, in parts of the country, insurance rates, not only this country but other countries, insurance rates starting to rise to reflect the increased risk, but that is our role in society to do that. And it is the signal we send. We are a bit of the canary in the coal mine saying, you know, risk is up so price is up.

You know, the second question you ask about our role as investors, the answer is absolutely, yes, we are applying ESG filters to——

Ms. CASTOR. Go ahead and explain.

Mr. BOUCHARD [continuing]. Environmental, social, and governance filters to 87 percent of our investment portfolio. We announced our decision, as I referenced, to begin to have dialogues and perhaps even divest and stop underwriting certain carbon intensive——

Ms. CASTOR. I saw that Chubb insurance made——

Mr. BOUCHARD. Chubb has done that as well.

Ms. CASTOR [continuing]. Coal-related——

Mr. BOUCHARD. There are a number of insurers who have done that, yeah. So we certainly are looking at the carbon intensity of our investment portfolio and taking actions appropriately.

Ms. CASTOR. Thank you very much.

Mr. Palmer, you are recognized for 5 minutes.

Mr. PALMER. Thank you, Madam Chairman.

I want to talk a little bit about the storm damages. You know, there is a report out from Roger Pielke who supports the idea of human-caused climate change, but he points out that over the last 20, 30 years, that the percentage of global GDP storm damages are actually lower than they were, say, in 1990. And also point out that when you look at it historically, the dollar values are more reflective of the fact that we have got more structures, more people living in coastal areas. And then I add one last point to that, is that the International Panel on Climate Change's last report indicated that the number of Atlantic storms, particularly those are the ones that tend to impact our coastal regions the most, have not increased in number, nor intensity.

Mr. Walker, would you like to comment on that?

Mr. WALKER. You know, we have noticed that they come in waves. You know, down where we are, we tend to have storms in cycles. And so, you know, you look back all the way to Hurricane Andrew, then, you know, we had Katrina, Rita, Gustav, Ike. I mean, you know, it just—it does come in cycles. I can't tell you that it looks like it is any more severe, but we have been through a pretty good stretch where we did not have storms.

Mr. PALMER. A record——

Mr. WALKER. We were able to get some things done now where we are to help protect us. And so, you know, I can't really comment

too much on the science of it but, you know, we just know they are coming.

I have been dealing with storms since I was born. I was born right before Hurricane Betsy in Houma and so, I mean, we face storms constantly down there. And what we do know is if we don't do anything to protect ourselves, that we are going to pay the damage. We seem to be gaining some progress right now.

Mr. PALMER. That is one of the main points that I have been trying to make as a participant on this committee is that we know that the climate is changing. There is a historical record that indicates that the climate changes and it will continue to change.

The thing that concerns me is the lack of attention in regard to preparing for that change, you know, using our technology and our engineering capability to prepare for that, to be able to adapt and mitigate. And I think that is one of the bigger issues. We seem to be wrapped around the axle about it is all about carbon, when there are certain natural things that are occurring that we can't do anything about that is going to impact us.

I also want to go back to this issue of preparation to adapt and mitigate. Your State particularly has had a difficult time with the Corps of Engineers in doing some mitigation work. We had a hearing, I was chairman of the subcommittee on the Oversight Committee, and we had a hearing with a representative from the Army Corps of Engineers. And I asked how many studies they had underway that were over 5 years old, and he said about 100, which, frankly, shocked me. It might not have shocked my colleague from Louisiana, Mr. Graves, but I found that shocking.

So I asked him to send me a list of them, and among those were the Comite River that had been studied for 30 something years, about building a diversion canal from Comite River over to the Lilly Bayou. And Louisiana residents had been concerned about a possible major flood and the damage that it caused. And, of course, in 2016, you had that flood, lost lives, billions of dollars in property damage. And they finally decided to build that canal. They have broken ground on it.

But out of that list of studies, and there were 97 of them actually, 40-something of them were more than 5 years old. The Corps of Engineers has spent $140 million on that.

That is part of my concern, particularly when you are dealing with insurance and stuff, is that we are not investing infrastructurewise, technologywise, and preparing for the climate change that we know will come, that we must be prepared to adapt to and have mitigation strategy.

You want to comment on that?

Mr. WALKER. Yeah. I mean, as you know, we face the same thing down where we live. You know, all the way since 2000, we have been trying to get levees built. You know, at some point, we just decided it was time to do something on our own. Actually, right after Katrina, it really helped things happen because, you know, we could see that, just decide to do something. And so we just decided we were going to do it ourself.

Our neighboring parish, Lafourche Parish, had done it years before that. They had protected themselves with levees, and all of those storms that came through there when they had that system,

you could see they didn't flood, we flooded. I mean, it is pretty easy, it is simple, it is not science. You know, so we just decided to do it. And thank goodness we did, because this past 2 weeks, we would have had the same disaster happen again.

You know, we are—just recently, I think a study was started that we asked for of the Corps of Engineers, because we realize the cost of what was being estimated for that system was not what we were realizing. We could build it a lot cheaper than what that original estimate was. And so now, I am hoping that that might help so that we at some point can break that ice and get some Federal dollars to come down, because, you know, when you are one-third of what the original estimate was, that is a whole lot better cost-to-benefit ratio. Right now, the cost-to-benefit ratio to the Federal Government is infinity. We have put every dollar in, so they are getting all the benefit. We have not gotten anything.

So I think it is a great time to talk about sharing and doing—you know, breaking that backlog that we have and maybe looking at some of those costs to see if those are realistic.

Mr. PALMER. I appreciate your testimony.

I yield back.

Ms. CASTOR. Thank you.

Ms. Bonamici, you are recognized for 5 minutes.

Ms. BONAMICI. Thank you.

I really appreciate all the witnesses being here today. This is important to hear the business views on the cost of climate change. Businesses are employers. And we have had a lot of conversations in the select committee, on which I am honored to serve, about the jobs that can be created, and how this—we can address the climate crisis while supporting our economy and building and growing our economy.

Just yesterday, The Washington Post covered this. A pair of studies were announced. Someone has studied global temperatures 2,000 years, over 2,000 years, and found that over the past 150 years, there has been a rise in global temperatures far more rapid than any other warming period in the past 2,000 years. So it is very timely that we are having this conversation with this work in the select committee.

I represent northwest Oregon, and we have an economic vitality that is very dependent on the health of our natural resources. I have a—Columbia River is the northern boundary of the district, the Pacific ocean is the western boundary. Outdoor recreation is a year-round thing in Oregon, from skiing and snowboarding on Mount Hood, hiking on the Pacific Crest Trail. We have wonderful wineries that draw a lot of tourism. We have a prized dungeness crab industry and abundant fisheries. So there is a lot that is dependent, and we know the cost of inaction is going to affect all of these industries. So as I said, a hub for this industry. Outdoor recreation.

Keen Footwear, I want to mention, is one business that is actively identifying harmful chemicals in their supply chain and deploying safe alternatives. Columbia Sportswear headquartered just down the street from my office in Oregon, they are manufacturing jackets with fabric that is made from 100 percent recycled plastic bottles, dye-free, PFC-free, sustainably sourced down. They are

really doing a lot, a lot of the businesses, to be responsible. And consumers are responding positively, and I think we are going to see this across the country as businesses step up.

Mr. Bouchard, I noticed you mentioned that you have a LEED-certified business and you saved 30 percent in water and electricity in the first year. I have, in the district I represent, a gold LEED-certified business, First Tech Credit Union headquarters, built out of cross-laminated timber, which is kind of a win-win because you are using sustainable building materials.

So, Mr. Jabusch—did I say your name correctly, close anyway—you mentioned we get the economy we invest in. So are there policies, ways that we can transition our economy to one that will reward climate responsive financial opportunities over the status quo of depending on fossil fuels and harmful pollutants?

Mr. JABUSCH. Certainly. Similarly, I don't feel like I am in too much of a position to recommend policy, but there are things from a macroeconomic point of view that certainly would help. You know, obviously, a carbon tax would be huge and probably the first and most direct thing that we could do. There are externalities—and you just listed some of them, Congresswoman—to the price of carbon emissions, and those things do have a direct effect on the economy, on employment, as Chair Castor noted in her opening remarks.

And, therefore, it is not inappropriate to expect the economy and the taxpayers to get compensation for taking on the burden of those externalities directly. Currently, the emitters aren't taking those on. Someone needs to. And right now, it is kind of everybody. So I think that would be the first policy. You know, get rid of the subsidies for carbon and replace them with a carbon tax. That would be the first policy I would have in mind if I were a policy maker.

Ms. BONAMICI. Thank you. And I want to talk about some of the other small businesses that are really trying to respond. We have had wildfires, terrible air, the health effects too that are affecting people in our communities, acidic waters, harmful algae blooms, all endangering the livelihoods of people who rely on commercial fishing, sports fishing.

Ms. DiPerna, in your testimony, you mention that the climate crisis is no longer purely an environmental problem but has significant socioeconomic effects as well. How can we improve Federal support to help smaller businesses and workers better prepare for and mitigate the cost of the climate crisis?

Ms. DIPERNA. Well, not speaking particularly officially, I mean, I think one has to look at how the risks are being distributed, as Mr. Jabusch just said. These risks right now are not being priced into the economy, and they are bouncing around like during a chess game, like a pawn that doesn't have a square to land on. And these risks are not hitting the general economy because the risks are being borne by you, the Federal Government; us, the taxpayers; FEMA; insurance companies; and the victims themselves.

So I think some form of creative view of indemnification. When that risk chain hits the bottom, where does that meet? We all know that the Fed just put out a report that said 60-something percent of adults can't meet a $400 cash unexpected expense. So some form

of indemnification at that level. I think everyone would welcome the carbon price. I could share data with you of how many companies have imposed on themselves voluntarily an internal carbon price to help plan for that. And certainly, some form of review of the flood insurance policy. And back on jobs, I can talk all day about that. I have a lot of data to share with you.

Ms. BONAMICI. Thank you.

I know I am out of time, but real quickly, the companies that did impose that on themselves, was that driven by the leadership of the companies or by shareholders or by consumer demand? Where is that decision coming from?

Ms. DIPERNA. So that is a good question. It sort of knits itself together. I think part of it is the expectation that there will be regulation because it seems like the obvious thing to do. If you have a pollutant, you have to sort of somehow, quote, penalize it. We have a long tradition in this country of talking about cap and trade. We did it with sulfur. People are experienced with this internal pricing. Also, regulations. EU, they have a carbon price.

But mostly it is a planning tool. It is to make visible these invisible causes by projecting a surrogate within your system. And now, I can give you this data, companies are also imposing voluntarily a water—an internal water price as well, again, to plan, if they were being charged by somebody other than the moral compass, what would it cost.

Ms. BONAMICI. Thank you.

And I know I am out of time. Thank you for your indulgence. I yield.

Ms. CASTOR. Mr. Griffith, you are recognized for 5 minutes.

Mr. GRIFFITH. Thank you, Madam Chair. I appreciate it very much.

Mr. Walker, I am looking at your testimony and I heard your testimony when you gave it, and I find it very interesting. The Morganza Action Coalition, also known as MAC, was created apparently in 2006 to advocate for Federal funding to complete the levee protection project. And you are currently the president of that. Is that correct?

Mr. WALKER. Yes, sir.

Mr. GRIFFITH. I then noticed in the next paragraph, a line that we have heard before in these hearings, and that was you want the Federal Government to help but largely to get out of the way of local efforts. Can you explain that a little bit more?

Mr. WALKER. Yeah. You know, when we decided to tax ourselves, we felt like we had the ability to do the work. And part of the problem that we have had all the way along is to get through the regulatory, you know, blockages that we have had, getting permits, getting access to easements, negotiating those types of things. And so, you know, part of what MAC has done, since we have not been able to get any funding and there is not always money to be gotten, was to try to advocate and change those—the ways that we have to go through that process.

Sometimes it would take up to 4 years to get a permit, when in 4 years, we have lost a lot of land in Louisiana——

Mr. GRIFFITH. Was that a Louisiana problem or a Federal problem?

Mr. WALKER. Well, for us, it was a Louisiana problem because we are building the levees in Terrebonne Parish.

Mr. GRIFFITH. But, I mean, was it a problem of getting Louisiana permits or Federal permits?

Mr. WALKER. At that point in time, it was really getting to the process with U.S. Corps of Engineers. And we have made some progress. We have—we feel like at this point we are gaining strides. Recently, we did get them to look at the cost again. And I think, to us, that is a large step for us to the possibility of us breaking the ice to get some Federal funding.

Mr. GRIFFITH. And I appreciate it. What is interesting is we heard earlier from Delegate Keith Hodges of the Virginia House of Delegates, celebrating this coming week their 400th anniversary of being a legislative body, and I would argue the oldest legislative body, to have continuously met and be elected in the world, but they only claim North America, but I think you can make an argument. But, nonetheless, he said we are trying to do what we can on the coast of Virginia, but we run into a lot of regulatory problems and things that get in the way.

Have you found that—besides the Army Corps, have you found other regulatory problems that slow you down in protecting your Louisiana properties?

Mr. WALKER. Not so much for us. I mean, that was the biggest hurdle for us, other than funding for more construction.

Mr. GRIFFITH. All right. Now, I am also curious that you said you figured out a way to cut the estimated cost by a third. And, obviously, dikes or levees are not new technology; they have been around for about 3,000 years or maybe longer. But tell me how you got the cost down to about a third of what the estimated costs were to be.

Mr. WALKER. Well, we always knew what the cost was because we are building it down there.

Mr. GRIFFITH. Right.

Mr. WALKER. And so we have built this system to Federal standards. The alignment that we have is the same alignment that was approved by Congress. You know, we could see what we were spending on this, and so we just asked. Finally, we had the ear of the Corps, and we were able to get them to consider looking at what the real cost is. We have enough of the system built now that we know what costs are.

So they have teamed with us. We finally have been able to work with them. We feel like they are on our side, and so we are hoping that that does help us finally get some funding.

Mr. GRIFFITH. And I assume that your organization, the MAC, or the Morganza Action Coalition, would be more than willing to share whatever you have learned in the process of building protective dikes, levees and so forth with other States as well. Would that be correct?

Mr. WALKER. Certainly, it is a little unique down where we are. We are in marshes. We are in areas that are not quite so stable that some states have, but we would love to share the process.

Mr. GRIFFITH. Well, I had some ancestors from Louisiana, so I have always been interested in Louisiana. But I also,—because our textbooks were old in the mountains of Virginia. When I was grow-

ing up, we had textbooks that talked about the ongoing project of the Zuider Zee reclamation which, of course, was finished in 1933, but we were still studying it in the early sixties as an ongoing project. But they built a massive dike and reclaimed a huge area, which I have actually been in, the Zuider Zee where it is just mostly industrial parts today. So I think there is a lot of promise.

You would agree with that, would you?

Mr. WALKER. Oh, absolutely. We have studied things down where we are too.

Mr. GRIFFITH. Yes, sir. I appreciate it greatly.

And I yield back, Madam Chair.

Ms. CASTOR. Thank you.

Ms. Brownley, you are recognized.

Ms. BROWNLEY. Thank you, Madam Chair.

I appreciate all of you being here today. And I must say, reading your testimony last night gave me a lot of hope in terms of growing partnerships between being a good steward of our planet and along with the business community of taking a larger and larger role in that.

And, you know, you had mentioned industry wanting certainty and a level playing field, and I believe that that is very true when you talked about insurance, indemnification, and infrastructure, but yet industry, you know, here on Capitol Hill, industry still knocks on our doors and says we want to get rid of all these regulations, not all of them, but, you know, we are continuing to lobby against so much of some of the regulations that are out there. And I represent a large agricultural community, so I hear from my farmers all the time about regulations and how that interferes, and them being bigger producers of whatever they are growing.

But, you know, when are we going to—you know, when we are we going to hit that tipping point where—I know in California, you know, labor became, you know, a great partner in all of us who were trying to improve our climate and became a big partner in that. When do you think businesses really, you know, on a more global basis, here in the United States anyway, is going to become a better—a true partner in understanding that we are all going to be winners if we collaborate together to begin to solve some of these issues? It is just to anybody to answer.

Mr. BOUCHARD. Well, let me at least begin to answer that question. And it is a difficult question because it is such a——

Ms. BROWNLEY. There are so many variables. I understand.

Mr. BOUCHARD. There are so many variables, right, depends the sector you are, I mean, the regulation you are facing. In some cases, perhaps——

Ms. BROWNLEY. But at some point we are going to hit a tipping point, I mean, broadly speaking.

Mr. BOUCHARD. I guess the point I would make is being active on these topics for maybe the last 10, 12, 15 years from an insurer's perspective, I have never seen the level of sincere action from business. Now, I lived in Switzerland for many years and I have worked for a Swiss company for the last 20 or so years, so perhaps I am tainted a little bit from a European perspective, but I will say that there is momentum growing and there are companies who are willing to make commitments and live by those commitments and

start to alter their own behaviors based on the commitments they are making. So I would agree with you. I don't think we have hit that tipping point yet, but I would say that we are closely approaching it.

Ms. BROWNLEY. Well, that is good to hear. You talked about—I think someone mentioned that this last year was a lower disaster year than previous years. It did not feel that way in my district. I represent Ventura, the County of Ventura in California, and 15 months ago, we had the largest fire in California's history. Until just recently, we had the Woolsey fire, which then—the Thomas fire was no longer the largest. We had northern California fires, including Woolsey, that then became the largest fires in California. So we are—the whole county virtually in my district is in that place of rebuilding, and I feel like I know FEMA better than I have ever known FEMA before.

Mr. BOUCHARD. Congresswoman, we are actually doing a report on—one of our post-event review capability reports on exactly that event. So we will have, as we have done with 15 other events around the world, we will have a diagnostic assessment of, not so much the physical activity, but almost the human-induced environment in which that activity happened.

Because what we find is that natural hazards or natural events do not always have to be natural disasters, and often it is either the policy decisions or the behaviors or other actions that humans have taken that actually exacerbate the event itself. So we will have a report, I think, within the next few months that certainly we can work with your office.

Ms. BROWNLEY. I would love that. And that is on the Woolsey fire then? Was it the Woolsey or the Thomas? Do you know?

Mr. BOUCHARD. I don't know exactly which fire, but I know it is the California wildfires.

Ms. BROWNLEY. Okay. Terrific.

Well, the line of questioning I was going for, and I know I am running out of time as well, but in terms of that rebuilding, you talked about how we have got to rethink how we rebuild after these disasters to build a more resilient community. And, you know, my question is, you know, if you were us, you know, what kind of policy would you put forward in terms of a national policy? Because there is disasters across the country and FEMA and the Army Corps and others are putting a lot of money into rebuilding, but are we rebuilding in a way that is going to help us in the future?

So I have run out of time.

Ms. CASTOR. So answer briefly, but then if you would, detail—provide a more detailed response for the record.

Mr. BOUCHARD. We will certainly do that. I would say the Congress took a great step last year with the DRRA, you know, the section 1, 2, 3, 4 that provides the 6 percent mitigation fund to FEMA. If our numbers are right, and we think they are conservative, 1 to 5, meaning you invest $1, you are going to save $5. $250 billion I think will go into that fund. Imagine how much money is going to be saved.

So I would continue to find ways to fund mitigation through the existing mechanisms you have as one start, but we will certainly follow up with other answers as well.

Ms. BROWNLEY. Thank you, Madam Chair.

Ms. CASTOR. Thank you.

Mr. Carter, you are recognized.

Mr. CARTER. Thank you.

And thank all of you for being here. Appreciate it very much. I think this is a very important subject.

First of all, let me start off by saying that I believe that climate change is real. I believe the climate has been changing since day one, and I believe that we have to do a number of things in order to address this situation.

A couple of those things are we have to adapt, we have to mitigate, and we have to innovate. This is what I have been talking about, resiliency, and what we need to be doing because there is no question about it. I represent the entire coast of Georgia, over a hundred miles of coastline, and we have had three hurricanes in the last 3 years, and we have seen what has happened. And we have experienced this, and it is important that we boot up resiliency and not just after the fact.

I wanted to start with you, Mr. Walker, because I also have a grandbaby in New Orleans, so I am very concerned about what you all are doing down there. I want to make sure you all take care of my grandbaby, okay?

Mr. WALKER. I think they have already taken care of New Orleans.

Mr. CARTER. Yeah, they have. But just don't get her talking funny like this other guy. Anyway, nevertheless—okay. I got some serious questions here. Seriously. But I do believe that it is going to take adaptation, mitigation, and innovation.

Mr. GRAVES. The subtitles for his comments are down below the digital screen.

Mr. WALKER. I like that. Sounds like Wendell.

Mr. CARTER. Nevertheless, I want to ask you, do you think that we are focusing then—not only just on this committee, but just in general when we talk about climate change. I mean, everybody wants to talk about, oh, we got to decrease carbon, we got to do this—and all that is important, I agree, but at the same time, I don't feel like we are emphasizing the resiliency enough. I just wanted to get your thoughts on that.

Mr. WALKER. You know, whether it is a fire in California or whether it is a flood in Houma, Louisiana, you know, you have to do something different. You can't keep doing the same thing. And so, you know, we finally realized that we had to do that.

You know, after Andrew, after Katrina, they started strengthening the building codes. I mean, that is wonderful. We get stronger and better construction that can withstand the wind. But we——

Mr. CARTER. That is right. And not to interrupt you, but you are exactly right. I give the example all the time. We have got a barrier island off of Savannah, Tybee Island. We are rebuilding the road now. You know, four or five times a year that road floods, not because of rain, but because of spring tides. Because the tides get so

high, it floods. Well, we need to build it up. We need to be smart about these kind of things.

I also give the example of, if you build a house on a slab next to the marsh, guess what? At some point it is going to flood.

Mr. WALKER. You will get wet, right. We understand that down in Louisiana. You know, after Ike, we have raised over a thousand homes in my parish. We are doing everything we can. We have rebuilt the barrier islands. We are building levees. We have raised homes. We are putting floodgates. We have got one of the largest floodgates in North America on our major waterway, the Houma Navigational Canal. So you have to do it all and you can't just do one thing.

You know, I am only active on the Morganza, you know, project primarily, but you can't sit back and wait for it to be done the same way every time. You have got to adopt.

Mr. BOUCHARD. Mr. Carter, can I jump in with a different answer?

Mr. CARTER. Yeah, please.

Mr. BOUCHARD. Another area that we have identified through our PERC analysis reports is that communication, how we talk about risk is not infiltrating policymakers or individuals or decision makers. The insurance industry is part to blame there.

We talk about 100-year events, we talk about 1 and 250-year events. I am not going to be 200 years old, so once I go through one of those, my natural assumption is I will never see one again. Whereas, if you think about the likelihood of being in a fatal car crash in Washington, D.C., 1 in 14,000, but every time we get in a car, that is in the back of our mind, if not the front of our mind. We drive safely so we are not in a fatal car crash. Get in an airplane. Your chances of dying in a plane crash are 1 in 11 million, but when you are in the air, or at least when my wife is with me in the air, you are thinking constantly about the possibility of an event.

We don't have that frontal lobe kind of awareness and understanding about natural hazards, not only in this country, but I think across the world. We need to do something to make this a more natural, that you would actually wonder why you don't rebuild that road in a different way.

Mr. CARTER. Exactly. And real quickly, just two more things. Another example from Tybee Island when we were having flooding there, we found out just how important sand dunes are, and we got to make sure that we are replacing those sand dunes. It is not always that you can wait on nature to do it. I mean, how can we assist in that? That was one of the things that we really worked hard on.

The other thing I want to mention because it is real big in my district, as it is probably real big in everybody's district, is the National Flood Insurance Program. You know, some of these homes we bought two or three times. I mean, that is ridiculous. We got to be smarter than this. You know, whether you think—whatever you think about climate change, we have to be resilient, we have to be smarter. And that is just the point that I am trying to make here.

And I realize my time is out. Boy, 5 minutes flies, I tell you. But thank you all for what you are doing.

And, Madam Chair, if I may, this is a good hearing today, and this is something we can all agree on. We do need to be more resilient. Thank you. I yield back.

Ms. CASTOR. Thank you, Mr. Carter.

Mr. Casten, you are recognized for 5 minutes.

Mr. CASTEN. Thank you, Madam Chair.

I would like to thank the witnesses. I would especially like to thank Mr. Bouchard, whose corporate headquarters are just outside Illinois 6, but draws on what many people have told me are the smartest, best looking, and most humble people in the country.

Mr. BOUCHARD. By the way, I want the record to show that was not in my testimony.

Mr. CASTEN. So climate change is a—I am glad I am in this hearing—because it is a fundamental deep, deep threat to our financial system, and I don't think we have really internalized what that risk is in the way that we are making investment and business decisions oftentimes not in as informed a way as we should have.

Let me give a couple numbers. My colleague, Mr. Palmer, mentioned the historic records, so let me just walk through some historic numbers. The Earth has already warmed about 1 degree Celsius since the 19th century. In the last few decades, as we have all talked about, there has been these extreme weather events. We have seen the arctic ice sheets melting, wildfire seasons are getting longer, parts of Alaska are on fire, mosquitoes are moving North carrying tropical diseases. It has only just begun.

We are talking—the most ambitious goals in Washington are talking about limiting future temperature rise to 1 to 2 degree Celsius. If you look back at the historic record over the last million years, there is a lag time, but every degree in temperature rise, on average, is about 2 meters of sea level rise. We have already got baked in 2 feet of sea level rise as it sits right now. What that means when you add that up is we are looking at sea level rise that we know is coming about the height of this room. Louisiana is done, Florida is done. And we don't think about that, as you pointed out, Mr. Bouchard. Our brains don't process these risks, but we have to deal with them.

And when I asked on the—I sit on the Science, Space, and Technology Committee, when I asked one of our scientists, at that level of sea level rise, what are the cities you are most concerned about, her response was the Eastern Seaboard.

So what does that mean if you are a property manager investing in assets in Miami Beach? What does that mean if you are a seed developer who has seeds that are not going to be able to germinate in my home State of Illinois within my lifetime? I think if you are an investor, you would like to know the answer to those questions. And the risks that we are facing in our financial system are going to make the 2008 financial crisis look like a walk in the park.

Now, it is also a fantastic opportunity, because almost everything we do to lower CO_2 emissions means that we burn less fuel, and fuel ain't free. I spent my whole career helping businesses do that, and I know that sometimes in this town, we think about spending money as how do you pay for it. In the rest of the world it is called

an investment, and it is a pretty good thing when you can invest money and save money. And I think we have got a real opportunity, provided that businesses understand both the costs of the risk they are exposed to and where there are investments that they have to hedge that exposure.

So I want to start with Mr.—everybody is saying your name wrong—Jabusch. In your testimony, you discussed how the nature of these underappreciated risks and opportunities often distort investment in capital deployment.

Mr. JABUSCH. Yeah.

Mr. CASTEN. Would standardized disclosure of those risks, including those that result from a corporation supply chain, risk to physical assets, and from the nature of their business plan, help investors like you better identify and better allocate capital?

Mr. JABUSCH. Yeah. Congressman Casten, one of the things I said in my testimony was there haven't been great guideposts to help investment managers figure out where, in relative terms, to place your forward-looking bets just because there isn't a standard, there isn't a required disclosure. There is no general agreed accounting principles. There is just everyone's best guess, and there is relative how does each company stack up inside of their own industry type of thinking, but nothing that is concrete and standard the way that regular financial regulations and disclosures are. So, yeah, I have to conclude that that would certainly help.

Mr. CASTEN. Well, I hope before you leave, you and Ms. DiPerna swap business cards, because in your testimony, Ms. DiPerna, you had mentioned that your CDP disclosure is both qualitative and quantitative and based, in part, on existing SEC disclosures.

Can you maybe expand on the prior comment and explain why it is important to have qualitative and quantitative disclosures in a standard format?

Ms. DIPERNA. Yeah, because we are not talking about completely concrete issues, as we just talked about. There are variables, and companies have to maintain a certain amount of nimbleness and qualitative judgment over the kinds of remedies they undertake. And as you pointed out, investment also requires a little secret sauce, so a qualitative disclosure allows the company the flexibility to try to put their best face forward.

That being said, standardization is, you know, invaluable, and we are very active. As I mentioned, we are trying to align—you know, we have been sort of a placeholder until there was some sort of guidepost that could be said to be standardized nationwide. In the meantime, however, we have aligned ourselves with the Task Force on Climate-Related Disclosure because they are seeking this kind of standardization.

I guess I got a red light there.

Mr. CASTEN. Am I already over on my time? Oh, all right. Well, let me—I had a bunch more, but let me just quickly say that——

Ms. CASTOR. I know you were just getting started.

Mr. CASTEN. The reason for this questioning is—I am very proud to have introduced H.R. 3623, the Climate Risk Disclosure Act, along with Senator Warren, which would do exactly this, quantify these disclosures and would basically help us understand what the exposures are to companies, both in terms of their contributions to

global warming and which companies have a strategy that is a useful hedge against that so that we can better allocate capital.

The bill has been endorsed by over 50 organizations. Madam Chair, I would like to ask unanimous consent to enter a letter of support for those organizations, for the record.

Ms. CASTOR. Without objection.

[The information follows:]

Submission for the Record

Representative Sean Casten

Select Committee on the Climate Crisis—July 25, 2019

JULY 15, 2015

Senator ELIZABETH WARREN,
Washington, DC.

Representative SEAN CASTEN,
Washington, DC.

DEAR SENATOR WARREN AND REPRESENTATIVE CASTEN: The 52 undersigned organizations write to you in support of the Climate Risk Disclosure Act of 2019. The bill is a necessary step to ensure that shareholders have the information they need to adequately mitigate financial, physical and legal climate-related risks to their investments. By ensuring that private capital can appropriately assess climate-related risks, the bill will help accelerate the transition away from fossil fuels to cleaner and more efficient energy sources and reduce the risk of financial instability.

Climate change poses significant challenges to businesses, whether or not companies have acknowledged this in their public communications. For example, fossil fuel companies already face worsening flooding at refineries, the potential for stranded assets, and mounting lawsuits by municipalities seeking to recover costs of adapting to climate-related sea level rise and other climate impacts. These impacts, and many others, will only intensify in the coming decades. Despite these risks, many companies continue omitting this critical information for their shareholders.

The international financial community is already taking steps to meet global commitments to rapidly transition to a low-carbon economy, striving to limit global warming to 1.5 degrees Celsius above pre-industrial levels to avoid the worst effects of climate change. The bill tasks the Securities and Exchange Commission with developing the standards that would allow systematic evaluation of climate-related risks, matching mainstream investor expectations as reflected in the 2017 vote by a strong majority of ExxonMobil shareholders demanding that the company report on its business plans for a world in which global temperature increase is kept well below 2° Celsius, as well as this year's vote by 99% of BP shareholders calling for the company to report on how its business plans align with the goals of the Paris Agreement and in the recommendations of the Task Force on Climate-related Financial Disclosures.

Ensuring that climate risk disclosure is standardized will allow companies and investors—especially those managing state employee pension funds and other long-term portfolios—to plan for a low-carbon future, and that science and data guide the process.

We are grateful for your leadership in addressing the necessity of climate risk disclosure and holding public companies accountable to their shareholders.

Sincerely,

1000 Grandmothers for Future Generations, 350 Bay Area Action, 350 Spokane, 350.org, Acadia Center, Alliance for Affordable Energy, American Family Voices, Anthropocene Alliance, As You Sow, Center for International Environmental Law, Climate Hawks Vote, Climate Reality Project, Connecticut Coalition for Economic and Environmental Justice Corporate Accountability, Dwight Hall Socially Responsible Investment Fund Earth Action, Inc. Earthworks Environment America Fossil Free California, Franciscan Action Network Friends of the Earth, Friends of Watersheds Gasp, Global Witness, Green Century Capital Management GreenLatinos, Greenpeace USA, Gulf Coast Center for Law & Policy Hip Hop Caucus, Institute for Agriculture and Trade Policy Interfaith Power and Light, League of Conservation Voters, League of Women Voters of the United States Mercy Investment Services. Movement for a People's Party Natural Investments LLC, Oil Change U.S., Polar Bears International Public Citizen, Rachel Carson Council Sierra Club, Sisters

of St. Francis of Philadelphia Sunrise Movement, The People's Justice Council, The Sustainability Group of Loring, Wolcott & Coolidge Trillium Asset Management, Trinity Health, Union of Concerned Scientists Unitarian Universalist Association Utah Moms for Clean Air, Vert Asset Management Voices for Progress.

Mr. CASTEN. And I am way over my time, so I just urge all my colleagues to please join the bill. Thank you.

I yield back my negative time.

Ms. CASTOR. Thank you, Mr. Casten.

Mrs. Miller, you are recognized for 5 minutes.

Mrs. MILLER. Thank you, Chairwoman Castor. And thank you all for being here today.

I know that many of our American businesses work diligently to be good stewards of our environment. My home State of West Virginia, due to geography, has had a lot of flooding, and I have seen how important it is for our communities and businesses to partake in predisaster mitigation to minimize the impacts of these natural disasters.

As this committee moves forward in making recommendations, we must ensure that we further protect businesses from burdensome regulation.

Mr. Walker and Mr. Bouchard, what is available to small businesses, at present, to allow them to be involved in predisaster mitigation?

Mr. WALKER. You know, I am not sure what programs there are, but I can tell you that for years, the people down where we are avoided trying to do it themselves. You know, it took repetitive, you know, storms to come through to finally, you know, get people moving down where we are. As I said, we taxed ourselves twice now to try to do what we do. And the reason we did that is there was not a lot of help from anything else. There was not a lot of other programs back then that we could rely on, and so the first times we tried to do that, the tax failed. But once you get beat up over and over and over, you know, people tend not to do something until they have experienced a problem with it, right? And that is what happened down where we are and, finally, we have got enough, and that is when we did what we did.

I am sure there is things now that can be utilized, but back then, we really didn't have anything else.

Mr. BOUCHARD. I guess I would—I might not have the accent, but I am going to use a Louisiana example as well. Zurich was a sponsor of a golf tournament in New Orleans the year right before Katrina hit. And following Katrina, we saw firsthand that it was really small business that felt the brunt. It was small business that wasn't returning, which meant people weren't coming back for the jobs. It meant people didn't go to a store or dry cleaner or restaurant to attend. It was—so your point about focusing on small business is a critical one, before the event, not after the event.

I would say that in terms of what is particularly or directly available to small business is probably—I know that an organization that I am part of, SBP, does education resilience, education for small businesses. So I think one thing that small business owners need to do is really understand their exposure, really understand—not only the exposure to their physical building, their storefront and whatnot, but the people who work for their businesses. Are

they going to be able to come into the office? Are they going to be able to come to the store and the shop? And there is a lot more that you have to think about when you think about business continuity, particularly a small business person who one or two people don't come to work and that is really going to have an impact as opposed to a thousand employer type of organization that perhaps that is not going to have as much of an impact.

So I would say education is certainly a part of it, and I would encourage small businesses in their local organizations to really start to demand a voice and a place at the table for local communities talking about pre-event mitigation.

Mrs. MILLER. Along those same lines, is planning for climate risk something that many small businesses have the resources or bandwidth to do?

Mr. BOUCHARD. Probably not. That is why I would not sit here and recommend that every small business go out and undertake the same level of disclosure and scrutiny that Zurich has done and many other global firms have done. I can tell you, as the last staff person to look at the CDP filing before it goes to management, it takes a lot of time to do this, to do it sincerely, at least.

So, no, I don't think we can expect small business to have that same level of depth of knowledge, but they can work with their insurance agent. They can identify their basic risk and the risk to their people and, again, ask and engage in the community level to say, hey, small business in this area needs more focus on preparation, because we are the ones who are going to pay the brunt after an event.

Mrs. MILLER. You are right.

Mr. Walker, I enjoyed your testimony when you talked about how the economy in Louisiana is dependent upon the energy industry. I see the same in my State.

What are some of the best practices that you have seen in Louisiana to increase resiliency both in your communities and actions taken by small business?

Mr. WALKER. Like I said, way back we realized that we needed to do something, you know, my community now has a hazard mitigation plan that we update every year, but we actually completely go through that on a 5-year basis. And so we look at every risk in our community with that plan, and so I think that was a good start to the process of what we really needed to build. It got all of the local community leaders in line to be able to do what we needed to do to control our risk.

Same thing at our State level. We have a State master plan and we, you know—excuse me—the CPRA, Coastal Protection and Restoration Authority, I couldn't get it out—was started so that we could look at those risks and go through, you know, an assessment of what really needs to be done and the focus of where—what funding we have needs to go. And so I think, you know, it is at the community level that it needs to start, and then it builds from there.

But, you know, right now, we have assessed that we had to block the storm surge that was coming in from every storm. It was just happening over and over and over, and that is where the Morganza system came to bear. And so now, you know, finally that we are making progress, we can see some of the fruits of it. Like I said,

this past storm came through, it was only a Category 1, we had about 60- to 65-mile-an-hour winds in Houma. Normally, we would have had a lot of flooding for that. We still had a little bit, but even with that Category 1 storm, we had storm surges up to 8 or 9 feet. Some of the levels of the system that we have were only built to that level, so we had some overtopping.

Ultimately, we would like to get it up to 18 feet. I don't know. You know, you may have a storm that can get over that. I am not going to be in Houma when that happens, but certainly having nothing was, you know, just a repetitive process of destruction and having to rebuild every time. So right now, we are feeling that we are making some progress on it.

Mrs. MILLER. Thank you.

Ms. CASTOR. Mr. Levin, you are recognized for 5 minutes.

Mr. LEVIN. Thank you, Chair Castor.

The topic of today's hearing is extremely important because, not only is climate change a threat to the health of our communities, but also to our economic prosperity, so I thank you all for the good work that you are doing.

I think it is important that those risks are explained and quantified, which is one reason I am proud to support the Climate Risk Disclosure Act, which my friend, Representative Casten, spoke about a minute ago. This important bill would require public companies to disclose how they will be impacted by the climate crisis, creating an environment of transparency for investors.

And before I get to questions, I do want to take just a moment and address some of the arguments I have heard against taking bold action. Sometimes we hear the arguments from business, sometimes from other people here.

First, we hear that the United States is already reducing greenhouse gas emissions better than anybody else, so we don't need to take any further action or make significant policy changes. I think it is clear that any reductions are hampered by the backwards policies that we are seeing from this administration. We only need to look to the 3.4 percent increase in carbon dioxide emissions in 2018 to illustrate this point.

To the extent we are making progress, we are making progress, in large part, because of the aggressive actions taken at the State and local level, such as the proliferation of State renewable portfolio standards as well as the policies of the last administration, like the fuel economy and tailpipe standards that President Trump's EPA is working so hard to undermine.

I applaud my friends on this day in the State of California for their major announcement that they went out and they negotiated a deal. My friend, Mary Nichols, and others, our attorney general, with four major auto companies. That is a big, big deal, and I wish we had that kind of leadership from this administration.

I have also heard, secondly, that the U.S. shouldn't act on climate because China and India aren't doing it, so why should we? But I think we should measure all of the things we are doing with the international impact and specifically the term "followership." So this is a good friend of mine, David Victor, at UC San Diego, Professor Victor always talks about how our actions and policies lead to other countries' similar actions and policies to reduce emis-

sions, or are the actions we are taking enable others to pollute freely with no regard for climate impact?

When we fail to lead, we are letting ourselves and others off the hook, and that is sometimes something we fail to acknowledge. So I think we have got to continue to use our economic power and our political power to pull others with us.

Third, some say that reducing greenhouse gas emissions will put people out of work. The reality is that the transition to clean energy creates jobs with high wages. The renewable energy industry is now one of the country's major employers. Almost 3.3 million people work in clean energy in this country, which is three times more than the fossil fuel industry, and the industry is continuing to grow. And in 2018, the renewable energy industry was the fastest growing workforce in 12 States in the union. These are jobs that can and must be made available to Americans living in all regions of the country, not just in California.

And finally, I have heard that emissions reductions will cost too much, but today's testimony from you confirm that the climate crisis could cost companies almost $1 trillion, while acting to address the crisis could have more than $2 trillion in upside due to increased revenue. So the real costs here are driven by failing to act.

You know, I am tired of people saying that they believe or don't believe in climate change. We believe in things that we may or may not know to be true. We know that climate change is true. The scientific evidence is overwhelming, and we have got to take action.

And with that, I will turn to questions.

Ms. DiPerna, in your testimony, you mentioned that European companies report more than double the potential business opportunity associated with climate solutions when compared to American companies. You say this could be related to the European Union's clear climate policy framework.

Can you expand on this point, and specifically, are there policies that create business opportunity in Europe or is it just the fact that they have a climate policy framework at all?

Ms. DIPERNA. No, I think there is some specific things. Again, back to Paris, which is a framework and a sort of universal target system. People can find their own way to the target, so that gives the companies the nimbleness they need, but everybody knows we are trying to get to 2 degrees Fahrenheit of increase maximum.

There are also some interesting things with regard to finance. The establishment of benchmark for indices that require companies that you can only be eligible to be listed in that index if you have a science-based target that is conforming with Paris. So if you are not aware of the science of Paris in building that in your business plan, you may be ineligible to be listed in European investment vehicles.

So they are throwing out the companies that—so this gives companies a guidepost to think about. You want to be in that index, I better get with the Paris science. And so, you know, the combination of science, policy, and capital, it has only worked together once, in my experience, which was in Paris where you had science, policy, and capital working together.

In the absence of U.S. leadership relative to Paris, that policy piece, the third leg on that stool, is very collapsed because we are

a big economy. If we were in there—and David Victor's exactly right. We are permitting people to do things which are not in their own interest or in the interest of people around them by a lack of coherence in a policy. Whatever the policy, it has to be coherent, and I can give you more details. But I think the differentiation between a coherent policy and a grab bag of policy is a very big obstacle for us.

Mr. LEVIN. Thank you.

And I see the red light in the corner of my eye, and I will yield back. I thank the chair for this great hearing today.

Ms. CASTOR. Thank you, Mr. Levin.

The ranking member is recognized for 5 minutes.

Mr. GRAVES. Thank you, Madam Chair.

Let me ask you all a question, a simple yes or no, do you believe that our own Federal Government—and I want to be clear, not talking about any particular administration, just collectively—our own Federal Government is doing a good job with adaptation and resiliency? Just a yes or no.

Mr. WALKER. No.

Mr. BOUCHARD. No.

Mr. JABUSCH. No.

Ms. DIPERNA. I have to say no as well.

Mr. GRAVES. Madam Chair, the thing is, look, you and I have discussed this. It is a space where I used to work for many years. We have identified the stupidity, and it is here. It is right here. It is in this city. It is in this body. We are not taking the steps and the policies. We are accepting mediocracy. We are watching as the Corps of Engineers—and I have said this before, my friend, Mr. Huffman, I mean, they may be slow but at least they are expensive. And everybody laughs, but it is sad because, it is—you know, Mr. Bouchard, it is our money. It is the Federal Government's money. It is your company's money that we are shelling out needlessly. This is so stupid what we are doing.

Study after study after study shows that for every $1 you invest, you get X dollars in return. You can find studies to show anywhere from $3 to 12 bucks. I think in some cases it is even higher.

We have allowed for this process to just sit there and morph into this complete—just stagnant process that is victimizing the very people that we are representing. Mr. Walker's organization, collectively with some of the State funds that we put forth, and like you said, they have taxed themselves more than any other community in the Nation and cobbled together—where are we—420 million bucks right now.

Mr. WALKER. Over that. About 440.

Mr. GRAVES. $440 million trying to protect their homes, their families, their businesses. And as he said—and I hope that that subtle remark he made, I hope that you all heard it, because of what the Federal Government has done, that is what has made them vulnerable, and that we can't even get the Federal Government to come to the table and participate with them. But I will pivot for just a minute.

Ms. DiPerna, I am curious, you made mention of the importance of stability or predictability, certainty—I don't remember which word you used. Couldn't agree with you more. How do we establish

certainty, predictability? How do we do that when—as I said in my opening statement, the U.S. is on a trajectory of reducing emissions—China is quadrupling the offsets that we are achieving? So how do you project certainty when you have such uncertainty?

Ms. DIPERNA. Well, I think as you pointed out, the global regime—I mean, China is a signatory to Paris. We are the only country that is outside of that consensus, so the certainty is Paris is trying to build to that certainty. I also think there is different kinds of certainty. There is scientific certainty. You can manage your business at least to that certainty. And with regard to the leakage——

Mr. GRAVES. Let me ask this: Is their increase in emissions, is that contributing to certainty or contributing to uncertainty?

Ms. DIPERNA. Well, I think that is a bit apples and oranges, because the leakage that you are talking about, emissions going up here, down there, I take a plane, you take the train. You take a plane, I take my bicycle. We are constantly trading off the tonnage that we are causing to be emitted. That is the same among companies. But you can balance that with a cap of some kind, a reduction target of some kind. That is the certainty that is missing, which is what is the minimum amount of emissions that an ordinary company should be permitted to emit under certain circumstances given a certain amount of time, and that is where it becomes complicated.

But I think, you know, certainty comes to us from all different—in all different forms.

Mr. GRAVES. I hear what you are saying. I am not sure how a country that is substantially increasing their emissions in any way does anything other than contributes to the uncertainty by sending the trajectory upward into concentrations we have never experienced. It is especially concerning. But let me pivot.

Madam Chair, as you know, every hearing I have, I want to give a compliment to my friend, Mr. Huffman, and today will not be an exception.

Mr. HUFFMAN. You like my tie?

Mr. GRAVES. I like a lot of things about you, Mr. Huffman, and one of the things I like about you is that one of the challenges that we have experienced with the Morganza project is this essential fish habitat issue, where the National Fishery Services come in and determine that when land erodes, it becomes essential fish habitat. So if you are going to come back and restore it, you have to mitigate for impacts to the fish. The fish didn't mitigate for taking our land. I don't know why we are forced to mitigate for taking theirs.

Mr. Huffman worked incredibly well in cooperative effort with us to come up with a solution for that to pass the House. We are still working on the Senate, but I want to thank you for that.

Mr. Walker, you noted that some of the regulatory challenges, in many cases, you all are carrying out projects that are actually environmental in nature, and our own Federal Government regulations designed to protect the environment are actually impeding you. Could you talk about that a little bit?

Mr. WALKER. Well, one of the biggest things that gives me heartburn is we have to mitigate to build a levee. Why do we mitigate to build a levee? That is the mitigation. We have already seen

where freshwater marshland is building back behind the system. So, you know, that is another thing we really want to study, is that we think just the fact that we are building that levee is improving the habitat. I mean, we know it is. So, you know, those are the kinds of things that drive us crazy.

You know, some of the other things that we face are with permitting, and we have had some good partners down where we are, you know, ConocoPhillips, Apache. The oil companies that own the majority of the marshland where we are have been our partners to gain access in right-of-ways to build these levees, but the permit process requires that they give us perpetual servitude. Who wants to give up their land to perpetuity?

So we have been facing those kinds of things down there where, hopefully, at some point, we can gain some ground with that. It makes it real costly because mitigation is not cheap.

Mr. GRAVES. Thank you, Madam Chair. I just want to make note that it may seem counterintuitive the levees actually protecting an ecosystem, but when it is exposed to open water, it erodes, you lose it all. The levee system actually stabilizes the ecosystem that is protected behind it, and we have got a number of examples in Louisiana.

I yield back.

Ms. CASTOR. Thank you.

Mr. HUFFMAN, you are recognized for 5 minutes.

Mr. HUFFMAN. Well, thanks, Madam Chair.

It is fun to hear Mr. Graves speak eloquently about the value of investing in adaptation, how we can actually get a multiplayer effect from those investments. The good news is we don't have to just talk about treating the symptoms here; we can also get a multiplayer effect by investing in decarbonizing and actually treat the disease.

So my understanding, Ms. DiPerna, you studied over 7,000 companies and found that over half of them were able to identify business opportunities in the transition to a low-carbon economy and you found a multiplier effect for a lot of those companies, didn't you?

Ms. DIPERNA. Yes. That is what they disclose. There are lots of opportunities that come along with, you know, taking measures to come into conformity with, you know, the need to reduce increased revenue, competitive advantage, even cheaper access to capital, because——

Mr. HUFFMAN. Those opportunities outweighed the cost of transition by a factor of seven in some cases. Is that correct?

Ms. DIPERNA. I think we set up factor—at least for the sample of the goal, the 500 largest companies, I think was double.

Mr. HUFFMAN. Thank you.

Mr. Bouchard, I am fascinated by your perspective on all this because I think, if we were all in the business of risk, and especially for reinsurers, the ultimate backstop for huge risks, we would have solved this thing a long time ago.

I have been working on carbon capture and sequestration for quite some time, and at our last hearing, I bristled a little bit when somebody referenced natural gas as a climate solution as clean energy, because it is not. When you factor in the methane loss, I

think it is likely no cleaner than coal. And my belief, because I think we are in a crisis here, is we don't have time for fake solutions. I am rapidly coming to the conclusion that carbon capture and sequestration is a fake solution.

Over a decade ago, I wrote a bill in California to try to set standards for geologic carbon capture and sequestration, because my mind was open. If we could find a way to dramatically reduce emissions, I found myself working with Chevron and other fossil fuel companies to try to get this done. We walked into a buzz saw of technical problems, and that bill, despite the support of all of this industry, despite bipartisan support in the California Legislature, didn't go anywhere.

I then found myself in Zurich speaking at a carbon capture and sequestration conference hosted by Swiss Re that year, where I got to hear a little bit of an inside perspective from the industry where I heard enormous skepticism from technical experts and economic experts in the industry that this would ever be cost effective or ever be feasible at scale.

And here we are today, fast-forward to 2019, and we still hear people talk about carbon capture and sequestration as the holy grail, but there are no projects that are actually doing it. We have a few, the Petra Nova power plant and others that get bandied about. They are doing enhanced oil recovery. They are not helping with the climate; they are actually producing more oil.

So I was intrigued to hear you say that you are offering liability coverage for carbon capture and sequestration. I am just wondering, are those policies selling?

Mr. BOUCHARD. No, they are not, sir.

Mr. HUFFMAN. Sounds like a pig in a poke to me. Do you have any reason to disagree?

Mr. BOUCHARD. I think when you look at the role that we play, and we are not a reinsurer, we are a direct insurer, right, so we are actually engaging directly with the industrial companies that are trying to look at these different solutions. You know, our role is to find a way to manage the risks that they would be facing for such a project.

So what we did is we combined kind of the technology expertise we had for our underground storage tank business with our traditional energy business and found a way to create a liability policy that we felt quite comfortable.

Mr. HUFFMAN. Okay. So you could figure out the cost of that risk, you can offer that liability policy——

Mr. BOUCHARD. Yeah. We think we can, but there has not been a lot of, shall we say, market demand.

Mr. HUFFMAN. And that seems to me a very significant fact, and I thank you for telling us that. Because if people were serious about really doing this, as opposed to the feel-good advertisements we see on TV all the time that say that, gosh, Exxon is already, you know, addressing the climate crisis because of carbon capture and sequestration, nobody is even serious enough to buy an insurance policy, I think that tells us a lot.

The other question I have for you is that you and your clients are basically picking up the externalized cost of decades of enormous profits from the fossil fuel industry. Do you have any ad-

vice—if you are advising the uninsured folks who are also picking up those externalized costs, and I am talking about governments, basically, and communities and folks that don't have fancy insurance policies, you are in the risk business, what would you advise governments to do to manage their risk?

Mr. BOUCHARD. Looking at the form that those externalized costs take today, it really goes back to that protection gap that I cited in my testimony. It is that gap between the economic losses and the insured losses.

So I think there are multiple things we can do. One is we can encourage more parties to not be uninsured, whether it is municipalities, whether it is businesses. Unfortunately, whether it is individuals. If you look at a typical catastrophic event, say, a hurricane or a large flood in the United States today, half of the losses go to individual households that are uninsured under the program today.

So we can do a better job of expanding, you know, the tools that are out there today to insure many people. And then I would say government, and we have been talking about it this whole hearing, can and should be focusing on creating these adaptation and mitigation programs that minimize those externalities.

Mr. HUFFMAN. Should those be funded by redirecting those externalized costs back to those who have been able to externalize them so well for so many decades?

Mr. BOUCHARD. Well, I think that is your job as a Congressman and a policymaker to determine kind of how to allocate funds and collect those funds, but I think there is—as the DRRA last year shows, there is funding already available in some forums that can make a major impact to mitigation today.

Mr. HUFFMAN. Thank you.

Thanks, Madam Chair.

Ms. CASTOR. Excellent. Well, I would like to thank our witnesses for your outstanding testimony, and our members who are here today. I think it is clear that we need to raise the consciousness of the American people, businesses, and hardworking folks about the escalating risk in cost of the climate crisis and to focus on the opportunities ahead and the solutions. And we have some time to do this, but we don't have a lot of time. So I will encourage all of you to answer some questions that we will pose in writing to follow up.

I would also like to let everyone know that the Climate Crisis Committee is going to go on the road. We are going to have our first field hearing starting in Colorado next week at the National Renewable Energy Laboratory and other folks focused on mitigation and adaptation and the solutions and opportunities for the future.

So thank you all again.

Without objection, all members will have 10 business days within which to submit additional written questions for the witnesses. Please respond.

With that, the hearing is adjourned.

[Whereupon, at 3:55 p.m., the committee was adjourned.]

United States House of Representatives, Select Committee on the Climate Crisis

Hearing on July 25, 2019, "Creating a Climate Resilient America: Business Views on the Costs of the Climate Crisis"

Questions for the Record

Paula DiPerna

Special Advisor

CDP North America

THE HONORABLE KATHY CASTOR

1. Many companies in the European Union are capitalizing on climate-related opportunities. What are some of the policies the EU has enacted to support businesses opportunities in addressing climate change and how can the United States learn from these successes?

First and foremost, the EU has set clear and coherent emissions reductions targets and goals consistent with the Paris Agreement. Each nation within the EU has its own nationally determined contribution, of course, but the EU overall has set reduction targets. All nations in the EU, therefore, are on the same "carbon diet." With a clear horizon line for reductions, companies can make intelligent investment decisions about when, how and where to achieve these reductions consistent with these targets. In turn, this regulatory certainty enables a longer term planning horizon for companies, which in turn enables them to make investments without concern that the return on investment has to be too short term to show profit.

Specifics on the EU targets can no doubt be found via the U.S. Foreign Service and U.S. Ambassador to the United Nations.

Policies on the financial front are of equal interest. The EU is making considerable efforts to make sure that basic investment vehicles and standards take climate change risks into account. In France, for example, companies are asked to show how their investment portfolios align with the national reduction target and other risk-related assessment concerning natural resource use, inside and out of France.

Also of considerable policy relevance is the European Commission High-Level Expert Group on Sustainable Finance (HI–LEG), which has examined and/or instituted numerous policies aimed at integrating climate risk considerations, and opportunities, throughout the investment landscape. U High-Level Working Group on Sustainable Finance. The final report of HILEG can be found here: https://ec.europa.eu/info/publications/180131-sustainable-finance-report_en

Of particular note is the move toward integrating climate risk through investment benchmark standards, which I referenced in my comments at the Select committee hearing in July 2019 To expand on those remarks regarding benchmarks, significant changes are underway to ensure the accuracy and integrity of the main categories of low-carbon benchmarks used in individual or collective investment portfolios by establishing two types of financial benchmarks: 1) EU climate transition benchmarks, which aim to lower the carbon footprint of a standard investment portfolio. More precisely, this type of benchmarks should be determined taking into account companies that follow a measurable, science-based "decarbonisation trajectory" by end-2022, in light of the long-term global warming target of the Paris agreement; and 2) EU Paris-aligned benchmarks, which have the more ambitious goal to select only components that contribute to attaining the 2°C reduction set out in the Paris climate agreement.

In addition, there would be an obligation for all benchmarks or families of benchmarks to provide an explanation of how environmental factors are reflected in their investment strategy, as well as how the methodology aligns with the target of reducing carbon emissions.

The intention of these benchmarks is to provide greater transparency and information for investors on the carbon intensity or "carbon risk" or "carbon footprint" of a given investment option.

Companies that do not meet the criteria for the new climate-sensitive benchmarks will be excluded from eligibility. So, to avoid exclusion, no doubt U.S. public companies will try to come into alignment. This begs the question of why then would their not be comparable efforts in the U.S. so that a U.S.-based company would be able to meet a single set of global minimum standards, which would reduce uncertainty and operational dissonance, not to mention reduce compliance review costs.

And disclosure regimes in the EU will track with new regulatory requirements, so companies will be required to disclose to the public and investors the degree to which their activities are aligned with the objectives of the above changes. Many of these requirements are enshrined already in the recommendations of the TCFD (Task Force on Climate Related Disclosure). CDP, which is a voluntary quantitative and qualitative global disclosure system, has aligned its annual questionnaire with TCFD requirements already, so companies disclosing to CDP, including in the US, are better prepared than others to align and comply with emerging requirements.

In the US, we have no comparable coherent policy efforts that integrate the exigencies of climate with investment frameworks and some would argue this can leave U.S. companies exposed to hidden climate risks—not to seek out may mean not to see.

2. Why are companies increasingly setting internal carbon prices and science-based targets?

On Carbon Pricing: CDP has been tracking use of internal carbon prices by U.S. based companies since 2013 (https://www.nytimes.com/2013/12/05/business/energy-environment/large-companies-prepared-to-pay-price-on-carbon.html) Since this 2013 report, the number of companies using an internal carbon price has only risen. Reasons companies use such prices vary: 1) to comply with existing mandatory cap-and-trade or carbon tax regimes in jurisdictions where same apply, such as the EU; 2) to prepare for mandatory regulation, since most far-sighted companies expect such regulation to occur, even if they do not press for it; 3) for internal planning and/or reward systems to encourage reductions among staff and/or budget considerations. For examples, some companies such as Microsoft, which pioneered internal carbon pricing, put each department in the company on a "carbon diet" and tie budget allocation to a department's ability to reduce its ghg emissions/unit of production, etc. These segmented reductions then add up to a company-wide reduction strategy, incentivized by an internal carbon price where planning occurs "as if" each tonne of ghg emitted carried a higher cost than is today visible. (For further info See link below to CDP Carbon pricing report, 2017)

Most importantly, internal carbon prices are an emerging international financial tool and lingua franc that helps companies price and gauge the financial costs of inaction as well as the premium attached to taking action. No matter the currency or price level used, only carbon prices can link financial implications to the actual physical problem—reducing tonnage of greenhouse gases going up into the atmosphere. Carbon pricing is quite literally becoming the coin of the realm.

Carbon prices are levied on a per tonne basis, and no matter what country, a tonne is a tonne is a tonne. Marrying this fixed physical unit to a price per that unit helps make it possible to compare relative costs and activities across companies, and within companies. And whether there are regulatory drivers that have created regulated carbon markets, such as in Europe with the European Union Emissions Trading Scheme, or in California, or in the northeast with RGGI, or individual state-based programs, or whether carbon pricing is purely a voluntary act of strategic and prudent planning, more and more companies are translating the language of tonnage to the language of costs via the mechanism of carbon pricing.

And whereas companies may express their internal carbon prices in local currencies for internal planning purposes only, as regulatory regimes emerge worldwide, ultimately those prices will be expressed in international currencies and become fungible. Companies that have acted early on carbon pricing will have their carbon accounting well in order—their diet plan in hand with a good grip on what it may cost.

Perhaps most to the post the standardized information in the CDP report enables investors to compare one company to another on environmental risk, to measure a company's progress over time, and to make investment decisions based on actual costs.

The extensive use of carbon pricing by companies suggest that they are increasingly preparing for the demands of a low-carbon economy and the extraordinary opportunities inherent in shifting away from a negative to positive. The less emissions, the less cost.

Through carbon pricing, the world speaks the same language and that can only help companies plan and be prepared for the unpredictable nature of climate risk, and think ahead to the significant opportunities that attend climate change intervention, innovation and technology shift.

On Science-Based Targets: Companies are increasingly setting science-based targets for similar reason as internal carbon prices: to conform corporate energy use and emissions patterns to the realities of climate science and predicted extremes of weather, supply chain disruption etc. Since the Paris agreement itself has a broad science-based target, complying with Paris means each company needs to manage

its own "slice" of that target. Also, as noted above, various benchmarks and investor esg requirements are increasingly asking whether companies have science-based targets and the HILEG revised benchmarks will make science-based planning mandatory. In short, having a science-based target is increasingly necessary to attract investment in jurisdictions outside the US. Since most companies are now global, companies must conform to the highest standards regardless of home base.

3. Can you discuss CDP's matchmaker program and provide some examples of these projects?

What is Matchmaker? Matchmaker is a specialized dashboard aimed at illuminating to potential investors climate-change related infrastructure projects that likely face a funding shortfall, but which represent significant environmental needs. Matchmaker cities disclose to CDP through the CDP–Cities program, and Matchmaker deepens their disclosure on infrastructure needs related to climate change. Many cities worldwide, including in the US, seek to implement local policies and infrastructure projects that address climate change and build resilience. But these projects are often isolated from basic economic development planning, and also from the investor community.

Matchmaker aims to bridge this divide. Launched in 2017, it provides subscribers with information on climate resilient infrastructure projects in cities through a specialized dashboard. Using data from 570 cities, collected through CDP, Matchmaker works with cities to highlight projects in flood control, waste management, sustainable transportation, renewable energy, water management, and energy efficiency and links them to the investment community. It serves as an important clearinghouse to provide cities with a streamlined pathway to showcase planned projects to the finance sector and better position them to mitigate against and adapt to climate change.

Another way of looking at this is that the Matchmaker pipeline represents a visible portion of the pending demand and need for project funding that could be met by private, public or innovative hybrid sources.

See Matchmaker Website (https://www.cdp.net/en/cities/matchmaker).

Potential subscribers include:

- Municipal banking
- Municipal bonds/municipal fixed income
- Impact/responsible investing
- Infrastructure/project finance
- Renewable energy development
- Corporate social responsibility teams
- Project developers
- Risk teams
- Credit rating agencies

Project types include:

- Renewable energy
- Energy efficiency
- Outdoor lighting
- Building retrofits
- Water management
- Stormwater retention/flood control
- Urban resiliency
- Greenspace/tree planting
- Waste management
- Waste recycling
- Urban planning/assessment

Current subscribers:

- Bank of America
- HSBC
- S&P Global

Quick facts on U.S. coverage in 2018

- United States
    - 314 projects from 98 cities
    - 161 total cities disclosed
    - $15.2 billion USD pipeline
    - Average project $86 million

Matchmaker events thus far in 2019:

- Washington D.C.

- Toronto
- New York
- Cleveland
- Chicago

Information on Dashboard includes:

- 2018 project disclosure from disclosure cycle
- 2017–2019 project disclosure from Matchmaker
- City-wide emissions
- City-wide emissions by sector
- Local government emissions
- City-wide emissions reduction targets
- Change in community emissions
- City climate change action plans
- City-wide emissions reduction activities by sector
- Renewable energy & electricity targets
- City climate hazard disclosure
- Impact of climate hazards by anticipated timescale
- City vulnerability assessments
- City adaptation plans
- City adaptation actions to reduce vulnerability by hazard type
- Municipal water risks
- Water adaptation actions by water risk

Selected actual Projects* on Matchmaker dashboard from the United States (at 30 Aug 2019)

*For city locations and further details, contact paula.diperna@cdp.net

SAMPLE CDP MATCHMAKER PROJECTS—U.S. SOLAR AND WATER FOCUS

- 98 U.S. cities reported 314 projects worth $15.2bn seeking investment through the annual disclosure to CDP.
- Of the 314 projects, 58 are renewable energy projects, 51 are energy efficiency projects, and 20 are water management projects.
- 19 U.S. projects have been submitted through our more detailed project intake process. These projects are updated on a rolling basis.

Project Sector	Status of Project	Total cost of project (USD)	Project Description
Renewable energy	Operation	10,000,000	2 MW initial solar farm for City electric utility. There is an additional 8 to 10 MW opportunity on reclaimed city land fill.
Renewable energy	Scoping	10,000,000	Series of solar energy and energy resilience investments for County facilities.
Renewable energy	Not reported	10,000,000	The City already has over 100,000 sq.ft. of green roofs and an additional 200,000 sq.ft. of parking garage roofs, both of which would be excellent candidates for large solar installations. Very few solar arrays have been installed to date, but zoning ordinances have been adjusted to allow for them. These roofs could potentially provide 1 megawatt of power. At an estimated cost of $10/watt this would come to $10,000,000.
Waste recycling/renewable energy.	Implementation	8,000,000	Match funds for a waste-to-energy project at the Water Pollution Control Plan to install a bio-digester to use food waste, organic fraction, and other bio-solids to create gas for CNG fuel or to generate electricity.
Waste management	Not reported	7,000,000	The City desires a biogas digestion plant to reduce biosolid landfilling, reduce carbon emissions, and creating a sustainable source of independent energy.

Project Sector	Status of Project	Total cost of project (USD)	Project Description
			The City owns and operates its advanced wastewater treatment plant (AWWTP), which processes waste from the City and portions of OTHER CITIES. A biogas digester could save up to 85% of emissions, which would be nearly 15,000MTON of CO2 mitigated. Furthermore, it could power nearly all of the AWWTP's energy needs and potentially sell energy back to the grid providing additional revenues.
Renewable energy	Pre-implementation	5,000,000	The City is looking to use power purchase agreements to increase solar on public buildings without upfront capital costs.
Energy efficiency/retrofits	Scoping	5,000,000	Municipal building facility assessments, retrofits and energy performance contracting.
Renewable energy, energy efficiency/retrofits.	Pre-implementation	5,000,000	Installation of solar PV, battery storage and deep de-carbonization/energy efficiency retrofits to create a Zero Net Energy facility with microgrid on the City's Main Library. Would include electrification of all water heating and HVAC.
Renewable energy	Scoping	4,000,000	5 solar PV sites for a total of 1.1 MW. Prefer PPA arrangement with buyout option. Some self-financing may be involved. Sites are municipal facilities.
Renewable energy	Implementation	4,000,000	Solar PV and battery storage for the NAME Water Pollution Control Plant. Current project funding obtained from [STATE SOURCE] to create 1 Megawatt of power generation, comprising 60% of the plant's electricity needs. The City wants to add additional PV generation to provide a basis for microgrid (solar + storage) installation.

REFERENCES PAGE

CDP Archives and Key Reports:

Report on Risks and Opportunities Associated with Climate Change as Disclosed by Companies, 2018: https://www.cdp.net/en/research/global-reports/global-climate-change-report-2018/climate-report-risks-and-opportunities

CDP Report on ESG and role of Boards of Directors/Investor expectations: https://6fefcbb86e61af1b2fc4-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/002/891/original/CDP-US-Report-2017-v2.pdf?1519227634

CDP Report on Use of Internal Carbon Pricing, 2017: https://www.cdp.net/en/climate/carbon-pricing

CDP Report on Mainstreaming of Low Carbon on Wall Street, 2015: https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/000/783/original/CDP-USA-climate-change-report-2015.pdf?1471960506

For further information see: www.cdp.net

Also contact: Paula DiPerna, Special Advisor, CDP: paula.diperna@cdp.net

○