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COMBATING CLIMATE CHANGE IN EAST ASIA AND THE PACIFIC

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BEFORE THE

SUBCOMMITTEE ON EAST ASIA, THE PACIFIC, AND INTERNATIONAL CYBERSECURITY POLICY

OF THE

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COMBATING CLIMATE CHANGE IN EAST ASIA AND THE PACIFIC

WEDNESDAY, JULY 21, 2021

U.S. SENATE,
SUBCOMMITTEE ON EAST ASIA, THE PACIFIC, AND
INTERNATIONAL CYBERSECURITY POLICY,
COMMITTEE ON FOREIGN RELATIONS,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:09 p.m. in room SH–216, Hart Senate Office Building, Hon. Edward J. Markey, chairman of the subcommittee, presiding.

Present: Senators Markey [presiding], Coons, Merkley, and Romney.

OPENING STATEMENT OF HON. EDWARD J. MARKEY, U.S. SENATOR FROM MASSACHUSETTS

Senator MARKEY. Welcome to a hearing of the Senate Foreign Relations Subcommittee on East Asia, the Pacific, and International Cybersecurity Policy.

The hearing will come to order, and it is a pleasure to chair this hearing on combating climate change in East Asia and the Pacific.

I have had the opportunity to meet with a variety of leaders and activists from all over the region, and no matter where they are from, at some point in the conversation, every leader, every activist, in this region raises the same issue—the threat that the climate crisis poses to their country, their health, their economy, and their future, and it is uniform.

To that end, this year I reintroduced legislation to create both a global climate resiliency strategy and a new humanitarian program for those who have been displaced by environmental situations, and that is only going to increase as each and every year goes by.

Earlier this year, I authored a provision included in the Senate-passed Innovation and Competition Act calling on the United States Government to facilitate a robust interagency Indo-Pacific climate resiliency and adaptation strategy, which passed unanimously out of this committee and is included in the innovation bill, because we do not have any time to spare.

The United States has a moral imperative to lead in the fight against climate change. We have got to go big to meet the scope and the scale of this moment because the world needs our leadership, and we need to be doing our fair share.

After all, around 40 percent of all the excess CO2 in the atmosphere right now is red, white, and blue. The rest of the world knows that we started sending up that CO2 in the 19th century

and it is cumulative over the years. It stays up there for a long time.

But despite that, too often we have abandoned our responsibility to those who have been impacted by fossil fuel development and scientific recklessness. We have been reaping the economic benefits while saddling others with the deadly consequences.

Take for example, the case of the Marshall Islands. We have a photograph here of a situation which we are responsible for because that dome stores the nuclear waste from 67 American nuclear tests in the Marshall Islands, along with 130 tons of radioactive soil brought over from a testing site in Nevada. It fills a huge crater, covered by a cement dome on Runit Island.

The Runit Dome is at sea level and is at risk of a full-on collapse due to rising sea levels and other effects from climate change. This region is rife with stories of climate-fueled danger and instability.

We are going to hear testimony from a young activist in the Philippines who lost her family home in Typhoon Haiyan, as super typhoons become the norm in this region.

In the United States, we need to resume our leadership role against climate change. We must remain committed to supporting and assisting partners and allies in adapting to urgent climate threats and avoiding future emissions.

This is the central tenet of the Green New Deal. It is the central tenet of what the rest of the world wants from the United States, to be the leader and not the laggard, to be able to go to Glasgow and say, here is what we are going to be doing and we expect reciprocal action from you as well.

That is our challenge, and this is our warning. This is a situation where the United States used the Marshall Islands as human guinea pigs to test our nuclear weapons, and we just stored all of that nuclear waste right there on the Marshall Islands.

Now they are saying to us that not only are they in danger from climate change and rising sea levels, but they are also in danger of seeing nuclear testing create a catastrophic situation.

We have responsibilities historically and we have to discharge them, and that is a big part of what today's hearing is all about.

We welcome all of our witnesses, and let me turn and recognize the ranking member of the subcommittee, Senator Romney from Utah.

STATEMENT OF HON. MITT ROMNEY, U.S. SENATOR FROM UTAH

Senator ROMNEY. Thank you, Mr. Chairman.

I appreciate the panelists being here today, and the topic that we are discussing is, obviously, of great significance to each of us in this room and the people around our country and around the world.

It is my view that 50 years from now, as people look back to our generation and ask what our legacy might have been, that upon which they will be most critical was our failure to act to prevent the warming of the planet and the climate change associated with that warming and that the political winds that prevented us from acting will be seen as an extraordinary lapse in America's judgment, and that this is a time for us to come together and to find

solutions that will actually help protect our planet for future generations.

I note, of course, that the challenge we are dealing with is global, not simply regional. It is not simply, obviously, an Asian issue, even though that is the topic for today—climate change as it relates to much of Asia—but also climate change here in the United States is of significance and around the world.

I will also note, Mr. Chairman and members of the committee, that my own perspective is that the only effective way we will have in dealing with climate change is through the advance in technology, technology which will be adopted not just here but around the world, and adopted because it is effective in reducing emissions and also lower cost than some of the carbon-based alternatives, because I think it is unlikely that poor nations in particular that are becoming developed will adopt technologies that are far more expensive even if they reduce CO2. They will move to those things which are less expensive.

So it is incumbent upon nations that have the resources we have to invest in technology as, fortunately, our colleagues have recently voted to do, invest in technology which will help not only us reduce our emissions, but also help others in the rest of the world.

I know that sometimes we are tempted to politically get behind initiatives that sound good, doing things here that that people here feel like, boy, we are doing green things here, is not that wonderful.

The reality is that those things will not make a hill of beans worth of a difference to reducing global emissions. They will cost us a lot of money, sometimes cost us jobs. Maybe not. Maybe they will actually create jobs in some cases. They will not actually reduce emissions.

What will reduce emissions is adopting technologies and developing technologies which will be used around the world. I fully concur with the view that America is responsible for a huge slug of the CO2 that is in the atmosphere, as the chairman indicated, beginning of the 19th century.

This, of course, was at a time we did not know we were doing anything wrong. Now we understand the consequence of this CO2 going into the environment and not acting would be extraordinarily shameful.

I would note that in the future the growth in emissions of CO2 and other warming emissions is going to be driven not by the United States, because, of course, over the last decade our emissions have been coming down as have those of the EU, but instead the developing nations, which, understandably, are getting washing machines and more automobiles, more electricity in the home, air conditioning, and as a result, China and Brazil and Indonesia and India are expected to dramatically increase their emissions of greenhouse gases.

So it is incumbent on us to take a close look at those places in particular and to see how we can help and encourage them to take action that does not add to the extraordinary burden that is in our environment.

I am concerned that China is hiding their CO2 plans by, if you will, exporting the production of facilities through Belt and Road

and putting infrastructure in place in other countries that will be emitting vast amounts of greenhouse gases, and they will say, see, we are not doing it. It is just being done in that other country, which, by the way, we happened to put that coal power plant there.

So understanding China's role and how we can work together is important. At the same time, I would note, and I know that the chairman and I agree on this, it is critical as we deal with China that, yes, we want them and other nations to reduce their emissions in their plans, going forward.

At the same time, we will not forget or look away, rather from the predations of their economic activities, their military activities in the South China Sea and elsewhere, and, of course, their extraordinary human rights abuses.

With that, Mr. Chairman, I turn back to you and our panel.

Senator MARKEY. Thank you, Senator Romney.

We have got just a great panel today, two panels actually.

This first panel consists of Richard Buangan, who is the Deputy Assistant Secretary for Public Affairs and Public Diplomacy, and Regional and Security Policy in the Bureau of East Asian and Pacific Affairs at the State Department.

He has served in several assignments throughout his career. We welcome you, sir.

Next will be Dr. Jonathan Pershing, who is the Deputy Special Presidential Envoy for Climate in the office of the Special Presidential Envoy for Climate Change.

Prior to his current post, Dr. Pershing was the program director of environment at the William and Flora Hewlett Foundation, and he served as the Special Envoy for Climate Change at the Department of State in the Obama administration where he coordinated the joining and implementation of the Paris Climate Agreement. We welcome you, Dr. Pershing.

Next will be Craig Hart, who is the Deputy Assistant Administrator for East Asia and the Pacific at USAID, a position he has held since August of 2020. He is a career member of USAID. We thank you, sir, for being here.

Finally, Melissa Dalton is the Acting Assistant Secretary of Defense for Strategy, Plans, and Capabilities, and prior to her appointment as Principal Deputy Assistant Secretary of Defense for Strategy, Plans and Capabilities, she was a senior fellow at CSIS.

So we welcome you here as well, Ms. Dalton, and we thank you for your service during the Bush and Obama administrations at DOE as an intelligence analyst. We thank you so much.

So let us begin then. Let us recognize you, Mr. Buangan. Each of you will have 5 minutes to make an opening statement, and then we will go to questions from the Senate panel.

Please begin whenever you feel comfortable.

STATEMENT OF RICHARD L. BUANGAN, DEPUTY ASSISTANT SECRETARY FOR PUBLIC AFFAIRS AND PUBLIC DIPLOMACY AND REGIONAL AND SECURITY POLICY, BUREAU OF EAST ASIAN AND PACIFIC AFFAIRS, U.S. DEPARTMENT OF STATE, WASHINGTON, DC

Mr. BUANGAN. Thank you very much, Chairman Markey, Ranking Member Romney, members of the subcommittee.

Thank you for the opportunity to appear before you today. It is my honor to speak with you about the importance of addressing climate change in the Indo-Pacific.

I am here to testify on behalf of the Department of State's bureau of East Asian and Pacific Affairs, which works closely with the office of the Special Presidential Envoy for Climate in the interagency to tackle the climate crisis in the region.

The Indo-Pacific region is a critical focus for U.S. climate policy and strategy. It is home to the world's largest greenhouse gas emitters and some of the countries most vulnerable to climate change. It is the nexus to global economic growth and recovery.

The Indo-Pacific is a top priority for the Biden/Harris administration, and our strategy for engaging the region on climate is very much aligned with our broader national security and strategic interests.

U.S. efforts to foster economic prosperity, uphold security, revitalize alliances in the Indo-Pacific region are deeply integrated with our climate strategy.

I would like to talk about three objectives that we are integrating and prioritizing—where we are integrating and prioritizing climate change issues.

The first is economic prosperity. U.S. economic prosperity is inextricably linked to the Indo-Pacific region. Climate change poses risks to property, infrastructure, human health, agricultural systems, and labor productivity, all critical to ensuring our people prosper.

The Indo-Pacific has the fastest growing energy use in the world, and it is projected to grow 60 percent by 2040. The right government policy decisions will be critical if the world is to achieve the goals of the Paris Agreement and a global net zero future by 2050.

In order to help Indo-Pacific partners meet their growing demand for energy, promote economic prosperity, and support our climate goals, the State Department, in coordination with the interagency, is sharpening the focus of our foreign assistance programs.

For example, we are realigning the Asia Enhancing Development and Growth through Energy, or Asia EDGE Initiative to support renewable energy development, energy efficiency, and advanced energy technology and policy.

The second objective is upholding security. Our approach to climate change has lasting implications for peace and stability in the Indo-Pacific region. At least 94 million in the Indo-Pacific were affected by climate-related disasters in 2019.

Pacific Island nations, many of them close partners of the United States, are threatened by rising sea levels and more severe tropical cyclones.

In the vulnerable Mekong region and the resource-rich South China Sea, changing climate could lead to disruption of historic food stocks, shortages of water, and climate-related migration.

In order to prepare for and respond to the security threats posed by climate change, the State Department is engaging vulnerable partners in the region to increase their resilience.

The third objective is restoring alliances. I would like to talk about the importance of restoring our alliances and how that relates to climate change.

The State Department is engaging at the bilateral, regional, and multilateral level. On the bilateral level, I would like to highlight the important work the U.S. interagency has done with Japan and the Republic of Korea on climate technology innovation.

I would also like to point to our partners in the Pacific. Addressing climate change is the single most important issue for Pacific Island countries who are critical partners for deterrence of adversaries in defense of the U.S. homeland.

We are elevating our engagement with Pacific Island countries to enhance their ability to adapt to the impacts of climate change and build resilience.

In coordination with the National Security Council and our interagency colleagues, we are expanding quadrilateral consultations with Australia, India, and Japan to incorporate discussions on climate ambition, clean energy transitions, and climate adaptation.

Climate can also be an area where our interests align with the People's Republic of China. It is the largest emitter. The world cannot successfully address the climate change challenge without significant additional action by China.

Although the climate crisis is a critical global challenge requiring increased and urgent action by all, the world is looking particularly to the actions the PRC will take in the near term, to the long term goals it sets and, importantly, to the plans it puts forward to achieve those goals.

The United States also recognizes that young people should be and many already are active leaders and working towards implementing climate change solutions. The Young Southeast Asian Leaders Initiative, or YSEALI, with more than 150,000 members and 6,000 alumni is the U.S. Government's signature program in Southeast Asia to educate and provide leadership skills to young people. YESALI members play an outsized role in tackling the climate crisis.

In summary, responding to the climate crisis is critical for our national security interests, our leadership standing in the region, and the long-term stability and prosperity of our allies and partners in the Indo-Pacific.

Now, I would like to give the floor to my colleague, Jonathan Pershing, from the Office of the Special Presidential Envoy for Climate.

[The prepared statement of Mr. Buangan follows:]

Prepared Statement of Mr. Richard Buangan

Chairman Markey, Ranking Member Romney, and Members of the Subcommittee: Thank you for the opportunity to appear before you today. It is my honor to speak with you about the importance of addressing climate change in the Indo-Pacific. I am here to testify on behalf of the State Department's Bureau of East Asian and Pacific Affairs (EAP), which works closely with the Office of the Special Presidential Envoy for Climate, the Office of Global Change in the Bureau of Oceans and International Environmental and Scientific Affairs, and interagency partners such as USAID to tackle the climate crisis in the region.

The Indo-Pacific region is a critical focus for U.S. climate policy and strategy. It is home to the world's largest emitters of greenhouse gases and some of the countries most vulnerable to climate change. The Indo-Pacific is also the fastest-growing region on the planet, with more than half of the world's population and nearly as much of global GDP. It is the nexus of global economic growth and recovery. The Indo-Pacific faces intensifying geostrategic competition among major powers including the United States and the People's Republic of China, as well as shifting power

dynamics among India, Australia, Japan, and the Republic of Korea. It is home to five of our seven alliance partners, seven of the world's largest militaries, and at least a third of all the world's military personnel.

For these reasons, the Indo-Pacific is a top priority for the Biden-Harris administration, and our strategy for engaging the region on climate is very much aligned with our broader national security and strategic interests. U.S. efforts to foster economic prosperity, uphold security, and revitalize alliances in the Indo-Pacific region are deeply integrated with our climate strategy.

Economic Prosperity: U.S. economic prosperity is inextricably linked to the Indo-Pacific region. The United States conducted $1.75 trillion in two-way trade with Indo-Pacific countries in 2020, and cumulative investment between the United States and partners in the region at the end of 2019 stood at approximately $1.9 trillion. In 2020, U.S. exports to the region accounted for approximately 28.8 percent of total U.S. exports, and imports accounted for 40.4 percent of total U.S. imports. The well-being of the American people and those in the region is tied together, and the climate crisis threatens our shared economic prosperity. Climate change poses risks to property, infrastructure, human health, agricultural systems, and labor productivity—all critical to ensuring our people prosper. Inclusive opportunity and prosperity built on strong commitments to address environmental and climate challenges will be integral to addressing the climate crisis and ensuring the economic security of the United States.

The Indo-Pacific has the fastest growing energy use in the world, and it is projected to grow 60 percent by 2040. A critical challenge will be how Indo-Pacific economies transition from an over-reliance on fossil fuels to clean energy while sustaining the region's dynamic economic growth trajectory. The right government policy decisions will be critical if the world is to achieve the goals of the Paris Agreement and a global net zero future by 2050.

In order to help Indo-Pacific partners meet their growing demand for energy, promote economic prosperity, and support our climate goals, the State Department, in coordination with our interagency partners, is sharpening the focus of our foreign assistance programs. For example, the Asia Enhancing Development and Growth though Energy (Asia EDGE) initiative is a whole-of-government effort to expand sustainable and secure energy markets throughout the Indo-Pacific. We are enhancing this program to support renewable energy development, energy efficiency, and advanced energy technology and policy. The Infrastructure Transaction and Assistance Network (ITAN) similarly aims to advance the development of sustainable, transparent, and quality infrastructure in the Indo-Pacific region and can also advance our climate goals through a greater focus on climate-smart infrastructure. The U.S.-Association of Southeast Asian Nations (ASEAN) Smart Cities Partnership also aims to promote sustainable solutions in transportation and renewable energy and is strengthening its focus to address sub-national climate challenges.

Upholding Security: Our approach to climate change has lasting implications for peace and stability in the Indo-Pacific region. As noted in this year's report to Congress on Indo-Pacific Climate Security, "geo-political and strategic competition—coupled with evolving economies, booming populations and urbanization, strong reliance on natural resources and capital, and impacts from climate change pose security risks with the potential to destabilize the region. Climate change has the potential to cause a significant and prolonged disruption to the ecosystems, infrastructure, and economies that support stable and prosperous societies in the Indo-Pacific."

At least 94 million people in the Indo-Pacific region were affected by climate-related disasters in 2019. Adverse impacts include more frequent and intense droughts, ocean acidification, increasingly severe cyclones, changes in the monsoon cycle, extended heat waves, catastrophic wildfires, devastating flooding and landslides, increased water insecurity, and rising sea levels. Pacific Island nations, many of them close partners of the United States, are threatened by rising sea levels and more severe tropical cyclones. In the vulnerable Mekong region and the resource-rich South China Sea, changing climate could lead to disruption of historic foodstocks, shortages of water, and climate-related migration.

In order to prepare for and respond to the security threats posed by climate change, the State Department is engaging vulnerable partners in the region to increase their resilience. One program, the Mekong Water Data Initiative, promotes good governance of transboundary water resources and timely sharing of essential data to improve hydrological and climate forecasting to mitigate impacts of severe floods and droughts. Announced by President Biden in March, the Small and Less Populous Island Economies Initiative will support climate initiatives, sustainable energy development, natural disaster response and resilience, and other critical environmental and sustainability issues.

Restoring Alliances: Finally, I would like to talk about the importance of restoring our alliances and how that relates to climate change. President Biden and Secretary Blinken have made clear that our network of alliances and partnerships is our greatest strategic asset. They enable us to combine our strengths to advance shared interests and deter common threats. Addressing the climate crisis in partnership with others can serve to restore our alliances in the region, and in turn, restoring our alliances will allow us to better address the climate crisis.

In order to achieve this, the State Department is engaging at the bilateral, regional, and multilateral level. On the bilateral level, I would like to highlight the important work the U.S. interagency has done with Japan and the Republic of Korea. The Administration is particularly enthusiastic about how we have broadened and deepened our cooperation with these allies beyond our traditional security agenda, and climate change has been a bright example. We are working closely with both countries on climate technology innovation.

I would also like to point to our partners in the Pacific. Addressing climate change is the single most important issue for Pacific Island Countries, who are critical partners for deterrence of adversaries and defense of the U.S. homeland. Pacific Island Countries have been instrumental advocates for ambitious global climate action. We are elevating our engagement with Pacific Island countries to enhance their ability to adapt to the impacts of climate change and build resilience, from investing in early warning systems to managing coastal resources. The Bureau of East Asian and Pacific Affairs continues to work closely with the interagency and engage our partners in the Pacific and plans to use bureau funds to support climate adaptation and projects for the Pacific islands.

In coordination with the National Security Council and our interagency colleagues, we are expanding Quadrilateral consultations with Australia, India, and Japan ("the Quad") to incorporate discussions on climate ambition, clean energy transitions, and climate adaptation. We also work closely with multilateral organizations such as the Association of Southeast Asian Nations, the Asia-Pacific Economic Cooperation Forum, and the Secretariat of the Pacific Community to address climate and energy issues. By engaging with others on climate adaptation and mitigation, we forge links between our peoples.

Climate can also be an area where our interests align with the People's Republic of China. China is the world's largest emitter, and we cannot successfully address the climate challenge without significant additional action by China. Although the climate crisis is a critical global challenge, requiring increased and urgent action by all, the world is looking particularly to the actions the PRC will take in the near term, to the long-term goals it sets, and—importantly—to the plans it puts forward to achieve those goals. We will continue to engage with China as we address the climate crisis. All countries, including the United States and China, must raise their ambitions on the road to COP26 in Glasgow.

In summary, responding to the climate crisis is critical for our national security interests, our leadership standing in the region, and the long-term stability and prosperity of our allies and partners in the Indo-Pacific. Moving forward, EAP will continue to seek ways to incorporate climate goals into our regional policies and programming.

Now, I would like to give the floor to my colleague Jonathan Pershing from the Office of the Special Presidential Envoy for Climate. He will further explain U.S. climate strategy in the region.

Senator MARKEY. Dr. Pershing, whenever you are ready, please begin.

STATEMENT OF DR. JONATHAN PERSHING, SENIOR ADVISOR TO THE SPECIAL PRESIDENTIAL ENVOY FOR CLIMATE, OFFICE OF THE SPECIAL PRESIDENTIAL ENVOY FOR CLIMATE CHANGE, U.S. DEPARTMENT OF STATE, WASHINGTON, DC

Dr. PERSHING. Thank you very much, Chairman Markey, Ranking Member Romney. It is a pleasure to see you and all the members of the committee.

It is really an honor to be here and have a chance to talk about this issue today. The agenda for the Indo-Pacific, as my colleague has said, is one of the most important that we are seeking to address on the climate file.

I have got some longer remarks, which I passed forward. I just want to make a couple of critical points that, perhaps, would amplify some elements of that.

As we look around the world, particularly at the Asia Pacific region, we can see significant and mounting costs of global warming, including more volatility in the climate. It is coping with severe typhoons.

It is coping with more intense and frequent droughts. It is coping with ocean acidification, with extended heat waves, with emergencies stemming from those from flooding, from landslides.

I saw in the paper today that more rain had fallen in one city in China in 1 hour than normally falls in 6 months.

This kind of intensity is unprecedented and driven by climate. It impacts economic growth, food production, disease. It leads to regional displacement. We had a chance to visit Bangladesh.

There are 20 million people in Bangladesh within one meter of sea level, and they are going to be displaced. That kind of an outcome is extraordinary.

As my colleague has said, the Indo-Pacific countries comprise about 45 percent of global emissions. China is the world's largest. India, Japan, Republic of Korea, Indonesia, all in the top 10. Australia, number 16.

The United States, with its climate diplomacy with these governments, is urging them and other major emitters worldwide to strengthen mitigation and to better align their 2030 greenhouse gas emissions reductions toward a net zero target by 2050.

China is the top priority. We have to find ways to work with China to drive the necessary action or we cannot keep the temperature at or below—well below—2 degrees Celsius with the hope of keeping it to 1.5.

President Xi Jinping said he would strive for carbon neutral emissions by 2060. We are pressing them to do more, to invest not in a coal-powered future but in a clean future.

I want to be clear on our approach and, Senator Romney, this is something that you have also mentioned as has Secretary Blinken and Presidential Special Envoy Kerry has said.

Other aspects of the U.S.-China relationship will not be traded for the climate discussion.

India and Indonesia are also top priorities for engagement. While I realize that India is not one of the jurisdictional members of this committee, it is a central player in the solution.

I just want to note that Prime Minister Modi's focus on driving clean energy is, perhaps, a harbinger for what we might do around the world with others. He is seeking to install 450 gigawatts of renewable energy, which would be an extraordinary achievement.

In Indonesia, the destruction of forests and the planting of crops on peat lands is the main source of national emissions, along with coal for electric power. To help, the Administration has launched a bilateral climate policy.

We have been working with our Indonesian colleagues on consultations focusing on mitigation, on nature-based solutions, on clean energy program, and on mobilizing financing to support climate mitigation.

Japan and Korea, also central players, large emitters but key partners in the region. Each has committed to 2050 net zero greenhouse gas emission goals. They have also committed to action in the 2020s. This is not a delaying tactic.

Japan announced a target of 46 to 50 percent carbon emissions reductions by 2030 from 2013 levels, and both the Japanese and Korean governments pledged to end public financing for new overseas unabated coal, a step agreed by all G–7 members.

Emissions are not our only priority. We have to help vulnerable countries build resilience to climate impacts, and the vulnerabilities are an acute risk in this region.

Six of the top 10 countries most affected by climate were in the Indo-Pacific: Myanmar, the Philippines, Bangladesh, Pakistan, Thailand, and Nepal. For many Pacific Island countries, it is actually an existential threat. It is their single most important issue.

Climate finance is going to be a critical tool for us to achieve these resilience goals. Enhanced resources will build domestic as well as diplomatic influence. We wish to build infrastructure cooperation in our foreign partnerships through the Build Back Better World, through the Blue Dot Network, and through bilateral programs.

We would like to deepen our cooperation with you in Congress to build U.S. resources and capabilities, particularly with the DFC, the Millennium Challenge Corporation, as well as enhanced support for USAID.

Our regional investment represents huge commercial opportunity. The global clean investment opportunity is between $78 and $130 trillion in low carbon power, grids, hydrogen, transport, and other sectors. Upfront investment from the U.S. is going to be critical to de-risk and align climate projects with what we need to see.

Achieving solutions to the Indo-Pacific mitigation and resilience challenges is the linchpin to solving the climate problem. We and our partners in the Indo-Pacific have to address the crisis which threatens regional growth and development.

Thank you very much. I look forward to the questions and the discussion with the committee.

[The prepared statement of Dr. Pershing follows:]

Prepared Statement of Dr. Jonathan Pershing

Thank you, Chairman Markey, Ranking Member Romney, and distinguished Members of the Committee. It is my pleasure to appear before the committee today to discuss the Biden administration's climate agenda for the Indo-Pacific region.

President Biden has identified climate change as one of the four "historic crises" facing our country, alongside COVID–19, the economic crisis, and racial inequality.

President Biden and Special Presidential Envoy for Climate Kerry have made raising global climate ambition a key pillar of the Administration's international climate strategy. The ambition strategy has three elements:

- Mobilizing a global effort to reduce emissions urgently;
- Helping developing countries build resilience and adapt to climate change impacts; and
- Catalyzing public and private finance to tackle the first two pillars.

In fact, the Indo-Pacific has a critical role in each of these three fronts. And the United States is working with counterparts in the region on all three.

We've seen the mounting costs and risk—economic, security, social—imposed by a warming and more volatile climate. This is evident across the United States and

around the world. We see it in stark terms in the Indo-Pacific. Our allies and partners see it, are confronting it, and seek our partnership to find solutions.

The scale of the challenge is daunting. As Richard Buangan noted, the region is coping with increasingly severe typhoons, more frequent and intense droughts, ocean acidification, extended heat waves and heat emergencies, devastating flooding and landslides, and more. For example, India and Bangladesh were struck by one of the world's worst climate-related disasters in 2020, Cyclone Amphan, which caused $14 billion in damage according to reinsurance company MunichRE. These dollar figures give a sense of the scale of the issue but are insufficient in capturing the loss of life and disruption to communities that these disaster events cause, and which are projected to become more costly, disruptive, and deadly without action.

These phenomena all create consequential impacts for the region in economic growth, food production and malnutrition, infectious disease, and regional displacement of affected populations. In turn, these developments have implications for the United States—most notably for our own economy and national security.

Today, the science is unequivocal: we need to keep the Earth's warming to 1.5 degrees Celsius to avoid catastrophe. To get there, the science says the world needs to get to a state of net zero greenhouse gas (GHG) emissions by around mid-century. Achieving that goal will require bending the emissions curve downward significantly by around 2030—making this the decade for decisive action. The United States is seeking enhanced action around the world, particularly this decade, to keep a 1.5 degrees Celsius limit within reach. That could take many forms, including net zero goals, enhanced Nationally Determined Contributions (NDCs), or sectoral initiatives.

And the Indo-Pacific will be a critical focus for that effort. Indo-Pacific countries comprise about 45 percent of global greenhouse emissions. China is the world's largest CO2 emitter, with India, Japan, the Republic of Korea, and Indonesia ranking in the top ten. Australia is the 16th-largest emitter. The United States, in its climate diplomacy toward these governments, is urging them and other major emitters world-wide to strengthen their NDCs to better align their 2030 GHG reductions targets with a net zero future by 2050.

The challenge is strong. According to the World Resources Institute, in 2018 the Indo-Pacific region's energy and industrial sectors alone accounted for roughly 38 percent of all global GHG emissions. The policies, measures, and investments the region takes to direct their economic growth to a climate-aligned pathway will be critical to achieving the goals of the Paris Agreement and a global net zero future by 2050.

China is the top priority in our global mitigation strategy. China represents almost 30 percent of global emissions, in addition to its carbon-intensive investments abroad. President Xi Jinping pledged to "scale up" its NDC and strive for carbon neutral emissions by 2060, among other mid- and long-term climate policy goals. But as the world's largest emitter, a 1.5 degrees Celsius future is not possible without the PRC increasing and accelerating its emission reductions for the 2020s.

Special Presidential Envoy Kerry made China one of his early overseas visits. He traveled to meet Vice Premier Han Zheng and Special Envoy for Climate Change Xie Zhenhua in April to identify areas for engagement.

The two sides issued a joint statement on how they would address the climate crisis, a first step in our engagement on climate. Notably, the PRC acknowledged for the first time that the world now faces a climate crisis. Both sides committed to take enhanced climate action that raise ambition in the 2020s, and to develop, by the time of the Glasgow COP this November, their respective long-term strategies aimed at net zero GHG emissions/carbon neutrality.

We have no illusions on the challenges we face, for the climate and for U.S. competitiveness. China is making enormous investments in carbon-intensive infrastructure both domestically and overseas. We must and will press China to limit its investment in a coal-fired power future. Simultaneously, China is moving aggressively to develop and deploy Chinese clean energy technology, both at home and abroad. Here, we must and will compete with China to assure U.S. clean energy technology and companies can compete in the lucrative and growing global clean energy market.

We must find a way to work with the PRC to drive the action necessary for the world to keep 1.5 degrees Celsius within reach. But our approach will be clear. As Secretary Blinken and Special Presidential Envoy Kerry have stated—climate is a critical standalone issue, and other aspects of the U.S.-China relationship will not be traded for enhanced climate action.

India and Indonesia are our other top priorities in the Indo-Pacific for engagement. We welcome Prime Minister Modi's continued focus on driving a clean energy

transformation in India, notwithstanding the extreme challenges posed by the COVID crisis there.

The United States and India are committed partners on climate. In April, the two governments signed the "U.S.-India Climate and Clean Energy Agenda 2030 Partnership." Under the partnership, the two sides identified a 2030 agenda for clean technologies and climate action.

A key focus will be cooperation to create the regulatory and market conditions to spur the required investment to achieve India's goal to deploy 450 GW of renewable energy. If achieved, India would realize transformative changes in both its energy security and GHG emissions trajectory.

Indonesia, the world's eighth-largest emitter of greenhouse gases, is also a significant priority for Special Presidential Envoy Kerry. The destruction of forests and planting of crops on peatlands is the main source of Indonesia's emissions. The draining of peatlands results in ongoing release of methane into the atmosphere, a greenhouse gas with warming potential 80 times more powerful than CO2. Land clearing has also resulted in massive forest fires that impacted air quality as far away as Singapore. Coal also generates a significant portion of Indonesia's emissions, and energy demand continues to grow.

Indonesia has taken some positive actions. President Joko Widodo issued a permanent moratorium on clearing of primary forest and peatlands, which has resulted in decreased deforestation rates and drainage of peatlands. He also created the Peatland Restoration Agency to rewet peatlands and stop the release of methane.

Indonesia also declared it would build no new coal-fired power plants after 2023, although approved but not-yet launched projects may proceed. Indonesia will be critical in achieving the necessary emission reductions to achieve global net zero emissions by 2050, but it will face significant challenges. The Administration has launched a promising bilateral climate policy consultative process with Indonesia, focusing on cooperation on mitigation ambition, nature-based solutions, clean energy, and finance mobilization to support its climate mitigation efforts.

We are pursuing similar cooperative agendas with other Southeast Asian countries. We aim to assure a clean energy transformation in these regions to mitigate the climate effects of the expected strong economic recovery and long-term economic growth trajectories.

A key challenge will be providing incentives for these countries to choose climate-friendly infrastructure options. Through its Belt and Road Initiative, the PRC often provides investments in carbon-heavy infrastructure to third countries, exacerbating the problem of economies making long-term investments that risk locking them off the path of the global clean energy transition, exacerbating the climate crisis and creating potential stranded assets.

Let me also note the role of Japan and the Republic of Korea—both large emitters but also key partners for us on our climate agenda. Each has committed to a 2050 net zero greenhouse gas emissions goal, which will be challenging given the nature of their economies, but achievable.

At President Biden's Leaders Summit on Climate in April, Japan announced a target of 46–50 percent carbon emissions reduction by 2030 from 2013 levels, a significant increase from its previous target. At the Summit, President Moon also announced the Republic of Korea would strengthen its NDC for 2030 in line with its 2050 net zero goal.

Importantly, both governments pledged this year to end public financing for new overseas unabated coal-fired power-plants (i.e. plants without carbon capture and storage technology). Their actions were a critical step in decarbonizing power systems worldwide. President Moon acted early in announcing this policy change at the April Climate Summit. Japan joined all G7 governments in declaring the same at the G7 in June at Cornwall.

We are also working with Quad countries through the Quad Climate Working Group where we are taking actionable steps on sectoral decarbonization, clean energy innovation and deployment, and on climate adaptation, resilience and preparedness.

Emissions reduction is not our only priority. Helping vulnerable communities build resilience to climate impacts is critical to our national security interests, our leadership standing in the region, and the long-term stability and prosperity of our allies and partners in the Indo-Pacific.

Climate vulnerabilities are an acute risk in the region—six of the top 10 countries most impacted by climate change from 2000–2019 were in the Indo-Pacific, according to the 2021 Global Climate Risk Index (Myanmar, the Philippines, Bangladesh, Pakistan, Thailand, and Nepal). For the Pacific Island countries, climate change poses an existential threat and is their single most important issue. Flooding caused

by 2–4 inch sea level rise and more frequent, more severe tropical cyclones will challenge the sustainability of low lying islands and coastal communities.

The State Department will support a unique island-led partnership, the Local2030 Island Network, a Hawaii-based initiative that links U.S. island jurisdictions with those in the Pacific and around the world in developing common solutions in a shared island context. This initiative will deepen relationships with critical Pacific Island allies with our own Islands providing solidarity and solutions. The National Oceanic and Atmospheric Administration and the Department of Energy will work with this network and other partners to enhance the capacity of island nations to integrate climate data and information, develop early warning systems, support net zero emission strategies, and apply effective coastal and marine resource management strategies to support sustainable development. This will complement the ongoing efforts of the U.S. Agency for International Development's (USAID) to support Small Island Developing States (SIDS) in the region and around the world to better prepare for and respond to climate impacts and disasters.

The Administration would like to deepen our work with Congress to build U.S. resources and capabilities, particularly a strong Development Finance Corporation and Millennium Challenge Corporation—and enhanced support for the U.S. Agency for International Development (USAID) to work with partner countries to implement climate mitigation and adaptation solutions on the ground. We wish to deepen our infrastructure cooperation with our foreign partners through the Build Back Better World initiative and Blue Dot Network, to offer inviting, climate-aligned options in this strategically critical region.

U.S. climate finance will be a critical tool for us to achieve our resilience and mitigation agenda. Enhanced climate finance resources would also bolster our diplomatic influence, particularly to advance our objectives on country actions to mitigate emissions.

According to Bloomberg New Energy Finance, the global clean electricity and hydrogen investment opportunity is at a scale of between $78 and $130 trillion in low-carbon power, grids, electrolizers, hydrogen storage, and transport globally. The good news is that there is a wealth of private and institutional capital seeking climate investment opportunities, and U.S. technology and companies could take a strong share if they are positioned right.

In many cases, upfront investment and involvement from the U.S. Government, other bilateral partners or the multilateral banks is necessary to help de-risk certain climate-aligned projects and unlock the flow of private investment. A critical infusion of U.S. official financing and facilitation could contribute essential direct investment toward a clean energy transformation pathway.

The combination of vast investment resources in the region and committed governments offers opportunities for partnership to drive climate transitions and realize investment returns. In the Indo-Pacific, Australia, Japan, South Korea, and Singapore have been positive contributors. The PRC, as noted earlier, has not.

Achieving solutions to the Indo-Pacific's mitigation and resilience challenges will be the linchpin to addressing the broader climate crisis. Assuring the stability, prosperity and sustainable development of the region is central to U.S. national interests. The United States and its partners in the Indo-Pacific must address the challenge of the climate crisis, which threatens regional growth and development and U.S. economic and security interests.

Thank you Mr. Chairman and Members of the Committee. I would be prepared to respond to any questions.

Senator MARKEY. Thank you, Doctor, so much.

Mr. Hart, you are up next.

STATEMENT OF CRAIG HART, DEPUTY ASSISTANT ADMINISTRATOR OF THE BUREAU FOR ASIA, UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT, WASHINGTON, DC

Mr. HART. Thank you, Chairman Markey, Ranking Member Romney, and distinguished members of this committee. Thank you for the opportunity to testify about the important role that U.S. Agency for International Development, USAID, plays in addressing climate crises in East Asia and the Pacific.

It is our honor to be here today. USAID is grateful for the ongoing collaboration with the Senate Foreign Relations Committee as

we work to align our efforts on climate change with a scope and complexity of the challenge.

Climate change is a global crisis that threatens our health, economic progress, and lives. It threatens development progress and exacerbates global inequities, increases water and food security, the need for humanitarian assistance and displacement, it worsens the quality of air we breathe, our health outcomes, and contributes to conflict.

The climate crisis fosters instability and threatens to undo the progress we have made and the taxpayer dollars that we have invested in global development, prosperity, and security.

The Biden administration is elevating climate as a core priority for U.S. foreign policy and national security. The United States is moving forward with an integrated whole-of-government approach to climate change that includes strengthened bilateral and multilateral partnerships to address this challenge at home and abroad.

We will work with other countries and partners to put the world on a sustainable climate pathway. USAID is developing a new agency wide climate strategy to target resources strategically, ramp up our change mitigation and adaptation efforts, and further integrate climate change considerations into international development and humanitarian assistance programs across all sectors.

We will look forward to continuing to engage with our congressional stakeholders as this strategy takes shape.

In East Asia and the Pacific, USAID is well positioned to support the Administration's bold climate change agenda and the implementation of the Paris Agreement by our partner countries.

USAID partners with countries to implement ambitious emissions reductions measures to reach the global goal of dramatically reduced greenhouse gas emissions by 2020 and achieve net zero emissions by mid-century.

USAID expertise and programs protect critical ecosystems, promote better forest and land management, and build resilience to the efforts and effects of climate change.

Our assistance helps countries improve food security, reduce emissions, and transition to renewable energy as well as promote sustainable climate investments.

To further the USG's shared vision for a free and open Indo-Pacific, USAID helps our partners to understand how to conduct open, competitive, tenders as well as to evaluate proposals to identify those which fit the country's needs.

USAID assistance helps our partner countries to identify climate solutions that do not saddle them with unsustainable debts but, rather, identify sustainable solutions.

To achieve our climate ambitions, USAID is focused on our comparative advantage, our field presence, and our ability to partner with key stakeholders.

This includes large corporations whose commitments to achieve net zero have doubled in the last year, government ministries and local communities most impacted by the effects of climate change.

This approach has allowed USAID to mobilize over $28 billion in climate finance since fiscal year 2016 worldwide.

To close, USAID is accelerating the scale of our climate change and environmental efforts to meet the urgency of this great chal-

lenge. We will engage with our partner countries, international donors, and the private sector to build local capacity and identify innovative approaches from green technologies, sustainable practices, and access to finance, and apply them with solutions on the ground.

USAID's climate investments abroad have a direct impact here at home. Climate change presents an immense challenge, one that we can and will meet.

USAID is a global leader in promoting climate adaptation and mitigation solutions, and will continue to support the Biden/Harris administration's bold climate agenda.

We are eager to work with Congress, our partner countries, and the private sector to achieve bold climate action across the countries and sectors in which we work.

Thank you very much, and I welcome your questions.

[The prepared statement of Mr. Hart follows:]

Prepared Statement of Mr. Craig Hart

Chairman Markey, Ranking Member Romney, Distinguished Members of this Committee: Thank you for the opportunity to testify about the important role that the U.S. Agency for International Development (USAID) plays in addressing the climate crisis in Indo-Pacific. It is an honor to be here with you today. USAID works closely with the Office of the Special Presidential Envoy for Climate, the Office of Global Change in the Bureau of Oceans and International Environmental and Scientific Affairs, and the Bureau of East Asian and Pacific Affairs at the Department of State to tackle the climate change challenge in the Indo-Pacific region. USAID is grateful for the ongoing collaboration with the Senate Foreign Relations Committee as we continue to align our efforts on climate change with the scope and complexity of the challenge.

The world faces a profound climate crisis. This is a global, existential crisis and we can no longer delay action or do the bare minimum to address climate change. It threatens lives, health, economic progress and livelihoods. Climate change threatens development progress and exacerbates global inequities; increases water and food insecurity, natural hazards, the need for humanitarian assistance, and displacement; worsens the quality of the air we breathe as well as health outcomes, and contributes to conflict. The climate crisis fosters instability and threatens to undo the progress we've made and the taxpayer dollars we've invested in global development, prosperity, and security.

BIDEN–HARRIS ADMINISTRATION PRIORITY

The Biden-Harris administration is elevating climate as a core priority for U.S. foreign policy and national security. The United States is moving forward with an integrated, whole-of-government approach to climate change that includes strengthened bilateral and multilateral partnerships to address this challenge at home and abroad. We will work with other countries and partners to put the world on a sustainable climate pathway.

The United States must work closely with partner countries to support their efforts to ambitiously reduce emissions, while ensuring that there is a "just transition" that also prioritizes the sustainable growth of the least developed countries. This will require large-scale private and public investments to transform economies, including the reshaping of energy, food, and transport systems. It requires creating incentives to reward stewardship and spur restoration and the conservation of ecosystems, forests, and other carbon-rich landscapes. It also requires addressing climate injustices and historical inequities by empowering local communities and groups, including women and Indigenous Peoples, to be change agents on climate and the environment. USAID leads international cooperation in these efforts. For example, within the quadrilateral partnership between the United States, India, Japan, and Australia (the QUAD), USAID leads the adaptation and resilience pillar of the group's climate efforts. We have already reached agreement on critical areas of collaboration like urban resilience, climate-smart food, agriculture, and the Coalition for Disaster Resilient Infrastructure (CDRI).

While climate change is an existential threat for the Pacific Islands on the very frontlines of its impacts, addressing climate change is a major strategic imperative

for the United States. As the United States is a Pacific nation, USAID's climate change investments in the Indo-Pacific have a direct impact here at home. Particularly as the world fights the ongoing COVID–19 pandemic, a global green economy offers a massive investment opportunity for U.S. businesses; new markets for American science and technology; new jobs in cutting-edge sectors; and a cleaner, safer world.

As requested by President Biden, USAID is developing a new agency-wide climate strategy that aims to be bold, ambitious, and transformative as it guides our efforts to address this crucial challenge. As this strategy takes shape, USAID looks forward to continuing to engage with our stakeholders, including Congress, to identify priorities and recommendations. We also welcome this committee's bill on restoring much needed U.S. leadership on climate change and clean energy.

USAID INDO–PACIFIC CLIMATE EFFORTS

Across the Indo-Pacific, USAID is well-positioned to support the Administration's bold climate agenda and assist our partner countries to implement the Paris Agreement. USAID partners with countries to help them: prepare for and adapt to climate disasters; improve sustainable water, forests, and land management; reduce emissions; increase food and water security and transition to clean energy. USAID also works with the private sector and international donors to help our partner countries leverage additional resources for climate change investment and identify sustainable alternatives to the People's Republic of China (PRC) non-transparent development model.

Adaptation and Disaster Response and Risk Reduction

The Pacific Island countries are among the most vulnerable to extreme weather events and other climate impacts, including increasing frequency and intensity of droughts and storms, rises in the sea level, and ocean acidification. Some countries are no more than 15 feet above sea level. Working with our partner governments, other donors, and the private sector, USAID continues to build the resilience of Pacific Island communities so they can prepare for, respond to, and recover quickly from these challenges. This is done by strengthening early warning systems for climate hazards including access to real-time data, helping to take early action, and strengthening the capacity of institutions, communities, and governments to proactively address risk to reduce exposure and vulnerability to natural hazards. For example, in the Federated States of Micronesia (FSM), USAID has responded to three major disasters since 2008, providing more than $78 million to help meet immediate needs, including of remote island communities, and to build back better.

In March of this year, USAID announced it will award up to $9.2 million, pending the availability of resources from Congress, to support the CDRI, led by India, to help foster disaster and climate resilient infrastructure. Physical infrastructure, such as roads, airports, and power grids is integral to any country's development, resilience, and ability to reduce the risk of disasters and respond to them. USAID will support CDRI to develop and share innovations, policy recommendations, and best practices in developing disaster and climate resilient infrastructure. USAID will also help countries incorporate best practices into their infrastructure planning, as well as foster partnerships between governments and the private sector to scale up disaster and climate resilient infrastructure development. USAID is proud to support CDRI, which is currently comprised of the governments of Afghanistan, Argentina, Australia, Bhutan, Chile, Fiji, France, Germany, India, Italy, Jamaica, Japan, Maldives, Mauritius, Mongolia, Nepal, Netherlands, Peru, Sri Lanka, Turkey, United Kingdom, and the United States; multilateral organizations including the European Union, United Nations, the World Bank, and the Asian Development Bank; and two private sector associations representing more than 400 companies.

USAID partners with the U.S. National Aeronautics and Space Administration (NASA) to strengthen the capacity of Mekong countries such as Cambodia, Laos, Thailand, and Vietnam to better predict and respond to climate change effects. We help address information gaps for our partners to improve drought and flood forecasting, and to use customized data, decision-tools, and best practice guides. For example, SERVIR-Mekong has recently been effective in pioneering digital rain gauges to predict rainfall in rural areas, estimate levels of dangerous short-lived climate pollutants that exist in air pollution, and forecast changes in river height and flooding. As climate-related disasters become more frequent and intense, these kinds of data and support from SERVIR-Mekong decision-makers can apply science and technology to manage environmental resources and improve disaster resilience and response.

Leveraging Investment

To achieve our climate ambitions, the United States will need to mobilize financing from many sources. USAID is focused on our comparative advantage: field presence and ability to partner with the key stakeholders. This includes large corporations, whose commitments to achieve net zero greenhouse gas emissions have doubled in the past year, government ministries, and local communities most impacted by the effects of climate change.

This approach has allowed USAID to mobilize more than $28 billion in climate finance since FY 2016 worldwide. We have done this through facilitating billions of international commercial finance through structuring renewable energy auctions, and supporting local small and medium enterprises through programs like Green Invest Asia, a blended finance mechanism that allows small and medium enterprises to operate climate-smart agriculture and forestry businesses. USAID boosts the capacity of government counterparts and other stakeholders to access larger amounts of financing from international adaptation funds, as well as strengthen the skills and systems within each country to better manage and monitor adaptation projects. Under the Biden-Harris administration, we look to expand and accelerate these efforts in the Indo-Pacific.

For example, since 2016, USAID has helped Pacific Island countries mobilize nearly $200 million from various international climate finance funds. USAID has also helped our partners identify and prepare bankable project proposals, valued at nearly $30 million, that have been submitted as final applications to leading international climate finance entities, including the Global Environment Facility, the Green Climate Fund, and the Adaptation Fund. USAID continues to support the preparation of additional proposals that will target access to more than $390 million in international adaptation funds for programs in the Pacific Islands.

Sustainable Water, Forest, and Land Management

Too much and too little water all too often bedevil countries impacted by climate change. USAID partners with countries to deliver climate-resilient drinking water and sanitation services, and improve the management of water resources so that people and economies can better cope with sea-level rise and rising water scarcity. USAID also works to protect our oceans—and the billions of people who depend on them for food and livelihoods—by mitigating climate impacts and addressing other critical threats, like ocean plastic pollution and illegal, unreported, and unregulated (IUU) fishing.

For example, the Mekong River Basin is a vital biodiversity area and the source of livelihood and nutrition for an estimated 70 million people. The PRC and other actors are increasing infrastructure investments in the region. However, without sound environmental and social safeguards, many infrastructure projects are developed at the expense of the surrounding environment and communities. The USAID Mekong Safeguards activity provides policy makers, government regulators, major financiers, and contractors with the information and tools they need to apply environmental, social, and governance standards for infrastructure development in the Lower Mekong region. This activity helps Lower Mekong countries build locally-developed solutions, improve transparency in infrastructure decision-making, and accelerate the role of the private sector as a driver of development. The Mekong Infrastructure Tracker is a prime example of a resource developed for tracking and monitoring of energy, transportation, and water infrastructure projects and the social, economic, and ecological changes they bring to the Indo-Pacific region.

USAID assistance in the Indo-Pacific results in greater public spending on water, sanitation, and hygiene (WASH) for the poor. For example, more than 80 percent of Indonesia's 265 million people still struggle to access piped water. With USAID support, the Government of Indonesia increased public spending in 2020 for WASH services targeting the poorest Indonesians. As a result, WASH services reached three-fourths of the poorest 40 percent of the population, compared to just one-fifth a year earlier.

In addition to access to clean water services to improve health outcomes, the health of our oceans is also critical. Pollution reduction, especially from mismanaged plastic waste, as well as proper resource management, will be necessary to ensure food security and economic prosperity for the Indo-Pacific communities reliant on the region's seas for their livelihoods. USAID will utilize the newly expanded Ocean Plastics directive to initiate the Save our Seas Blended Finance Platform, which will include a mix of technical assistance programs in key countries and private sector and donor partnerships to leverage greater funding. The ambitious goal of the new initiative is to reduce the flow of plastic into the oceans by 50 percent by 2030. It will demonstrate U.S. leadership by: (1) taking immediate action where it's most needed to maximize impact; (2) addressing key gaps to unlock existing and future

large-scale funds, and (3) harnessing global partners for much needed action. USAID's new ocean plastics programs will target coastal urban populations in key Indo-Pacific countries that are major contributors to the world's mismanaged plastic waste, as well as those, such as small island developing states, that face unique waste management challenges for which good solutions do not yet exist. This work will build on the successes of USAID's Clean Cities, Blue Ocean program, which is already working to combat ocean plastic pollution in key countries, including Indonesia, Vietnam, the Philippines, and Sri Lanka.

USAID works with our partner countries across the Indo-Pacific to reduce emissions by combating deforestation and improving conservation and management of carbon-rich forests, landscapes and seascapes. USAID partners with the private sector to increase market access for carbon credits, climate-smart agriculture, and sustainable forest products; and enhances finance opportunities for sustainable land management. For example, in Vietnam USAID develops local solutions with partner governments, communities, and the private sector to reduce greenhouse gas emissions and air pollutants, which in turn improves public health, reduces poverty and inequality, and lessens climate change impacts.

Indonesia remains one of the top greenhouse gas emitters from land use in the world. Unsustainable land management practices also lead to loss of biodiversity and unsustainable economic growth. Since 2015, USAID has strengthened Indonesia's ability to achieve its sustainable land management goals. As a result, we have helped reduce $CO2e$ [1] emissions by over 76 million metric tons since 2015, or 16.4 million cars driven for an entire a year.[2]

In Papua New Guinea, USAID is supporting a new program to improve forest governance, increase the sustainability of the forest industry, and protect the land and resource rights of communities to reduce emissions, enhance carbon sequestration and increase sustainable natural resources management. Papua New Guinea is home to part of the world's third largest expanse of tropical forest, the majority of which is community-owned. However, it experiences high rates of deforestation and forest degradation, due to unsustainable and illegal logging. This new program will allow USAID to prioritize work in a country with high climate mitigation potential.

USAID is helping the Government of Vietnam expand a program that mobilizes millions of dollars for forest and watershed protection through payments-for-forest-environmental-services by local businesses and utilities that benefit from these services. This work builds on years of cooperation—USAID initiated this program with Vietnam's Government in 2007. The program now mobilizes $127 million in Vietnamese domestic revenue annually for forest protection and is expanding to cover 6 million hectares of forest.

USAID has launched two new projects worth $74 million to help Vietnam mitigate the impacts of climate change. These new projects launched this year on Earth Day will help conserve a forest area nearly the size of Delaware and Rhode Island combined. Healthier, fuller forests, coupled with strong biodiversity, are critical to reducing greenhouse gas emissions.

USAID, in partnership with the Government of India, is improving the rehabilitation and management of more than 1 million hectares of India's forests to increase carbon sequestration, enhance water yields from forests, and strengthen the livelihoods of forest-dependent communities in three states, refining techniques that India will scale nationwide. USAID/India's new program, Trees Outside Forests in India, will incentivize more tree cover on private lands at scales from household to commercial.

Improving Air Quality

To improve air quality and reduce climate pollutants, USAID launched Clean Air Catalyst, a new flagship program to combat air pollution, alongside a global consortium of organizations led by the World Resources Institute and the Environmental Defense Fund. Through this program, USAID and our partners, including Columbia University, work with local communities in the region to better understand local pollution sources and identify, test, accelerate, and scale solutions for cleaner, healthier air. This scalable program will make the air cleaner and healthier, and it will also reduce emissions of short-lived climate pollutants like black carbon and methane, which must be reduced in order to meet the Paris Agreement targets.

The Building Healthy Cities (BHC) project is working in Indore, India to increase community participation in air pollution mitigation. In partnership with local stakeholders, BHC installed 20 low-cost air quality sensors across Indore to collect quantitative data, and trained and continues to support 20 local Clean Air Guides (CAGs), who work within their communities to raise awareness and develop solutions for the air quality issues they face.

USAID helped India launch a national program for retrofitting commercial buildings to enhance energy efficiency and improve air quality, and in doing so opened up tremendous business opportunities for U.S. companies in a country whose air conditioner market is growing at 15 percent a year. For example, USAID's support prompted India's lead implementer of energy efficient programs to solicit a $10 million contract—ultimately awarded to the United States-based Carrier Global Corporation—to install and maintain filtration systems and monitors in existing air conditioning systems in buildings in and around New Delhi.

The Mekong Air Quality Explorer Tool was launched last year in collaboration with USAID, NASA, the Royal Thai Government's Pollution Control Department and the Geo-Informatics and Space Technology Development Agency. The tool uses satellite data and computer models to provide an accurate air pollution forecast up to 3 days ahead of time. This allows the Royal Thai Government to fill data gaps and see air quality projections across the country, not just in urban centers like Bangkok.

As part of their ongoing efforts to combat pollution, USAID-Vietnam launched the Collective Action for Clean Air in 2019, with the goal of mobilizing and connecting its current network with more than 50 additional local actors and by providing more than 500,000 citizens, including more than 100 youth groups, schools and universities, access to information and educational materials to improve air pollution awareness and action.

Green Energy and Sustainable Infrastructure

Energy demand in Asia is expected to increase dramatically in the next decade. Without a concerted effort to promote a low-emissions power system, the region will continue to rely heavily on conventional energy sources such as coal and large-scale hydropower. USAID assistance helps increase access to more affordable, reliable, and sustainable energy that spurs economic growth, powers health systems, and reduces emissions.

The Infrastructure Transaction and Assistance Network (ITAN) is a whole-of-government initiative to advance sustainable, transparent, high-quality infrastructure across the Indo-Pacific region. Under ITAN, USAID plays a leading role helping its Indo-Pacific partners to catalyze private sector investment—including from the United States—by strengthening their ability to implement and manage sustainable, transparent, and high-quality infrastructure projects.

USAID leverages private sector investment and expertise across the Indo-Pacific to help our partner countries deploy renewable energy and transition to greater energy efficiency. To that end, USAID's Clean Power Asia program has helped mobilize more than $7 billion in renewable energy investments across Southeast Asia since 2016. The program has helped Thailand B. Grimm Power and Vietnam solar developer TTVN to close a $283 million deal to construct one of Vietnam's first solar farms designed to generate 257 MegaWatts (MW)—enough energy to power more than 50,000 homes. In Thailand, USAID Clean Power Asia worked with six Thai Union factories to procure and install 7.6 MW of rooftop solar projects valued at more than $10 million. USAID Clean Power Asia also helped retail giant Big C Thailand close a $4.8 million deal to launch a 3.6 MW solar rooftop program.

In India, USAID programs help support the country's transition to renewable energy. To meet rising energy demand and decarbonization goals, India is aggressively pursuing large-scale integration of energy from variable renewable sources, which poses challenges to power grid stability. USAID efforts helped inform the Government of India's roadmap for deploying renewable energy solutions and technologies. Specifically, USAID programs have helped India integrate 5 GW of renewable energy into the power grid, which reduced 30 million tons of greenhouse gas emissions in 2020, and is enough energy to power 3.3 million households.

In Indonesia, USAID helps the country diversify and expand its energy market to deliver electricity to more Indonesian households and create investment opportunities for the private sector, including U.S. companies. USAID has introduced tools to improve national and provincial energy and electrification planning, advanced grid modernization to absorb more renewable energy, introduced innovative smart-grid solutions for remote islands, improved energy efficiency practices, and supported the development of electric vehicles. Since 2011, USAID has mobilized $1.78 billion in renewable energy investment, representing an additional 667 MW of new energy supply, enough to reach 5.7 million Indonesians.

In Vietnam, USAID has supported the Government of Vietnam to design a strategic plan to guide the country on energy generation and transmission to meet energy needs as Vietnam moves away from a coal-based power system to a cleaner system based on renewable energy and natural gas. USAID assistance provided the software, hardware, training, and a data-sharing process to facilitate first time in-

volvement of multiple stakeholders to create a power plan that has also been transparently shared with the public. USAID also worked with government regulators, banks, investors, and private sector developers to facilitate solar investments totaling more than $300 million.

In recent years, Vietnam's solar energy production has grown exponentially—from less than 10 MW in 2017 to 16,500 MW in 2020, with solar power now making up nearly 25 percent of the country's power capacity. USAID activities will continue to support Vietnam to improve government energy planning practices, increase competition and private sector involvement in energy service provision, deploy advanced, clean energy systems, and improve grid planning to incorporate clean energy transmission. USAID will also focus on helping Vietnam attract qualified investors for advanced energy projects and advise private firms on developing high quality, bankable projects. By continuing to work with the Government of Vietnam and the private sector, USAID will help accelerate Vietnam's transition to a clean, secure, and market-driven energy system.

Achieving global net-zero emissions will require rapid phase-out of international support for coal power plants, but currently the PRC and Chinese firms are estimated to be pursuing 24,270 MW of new coal projects in emerging markets around the world. It is important to understand the underlying drivers that make PRC-financed coal appear attractive, and to identify more appealing and sustainable alternatives. This is especially relevant in the Indo-Pacific. USAID partners with countries to ensure they have the tools necessary to pursue least-cost generation options, which in most cases is renewable energy (RE). This includes structuring RE auctions that help to drive down the cost of wind and solar, and working with countries to overcome real or perceived barriers to integrating variable renewable energy sources into their grid. USAID helps our partner countries to understand how to conduct open, competitive tenders, as well as to evaluate proposals to identify those from predatory lenders or which do not fit into the countries' power sector plans.

CONCLUSION

To close, USAID is accelerating the scale of our climate change and environmental efforts to meet the urgency of this great challenge. We will engage with our partner countries, international donors, and the private sector to build local capacity and identify innovative approaches—from green technologies, sustainable practices, and access to finance—and apply them to solutions on the ground. USAID's climate investments abroad have a direct impact here at home. Climate change presents an immense challenge. One that we can and will meet. USAID is a global leader in promoting climate adaptation and mitigation solutions, and will continue to support the Biden-Harris administration's bold climate agenda. We are eager to work with Congress, our partner countries, and the private sector to achieve bold climate action across the countries and sectors in which we work.

Thank you, and I welcome the opportunity to answer your questions.

Notes

[1] https://www.epa.gov/moves/how-do-i-get-carbon-dioxide-equivalent-co2e-results-nonroad-equipment

[2] The standard measures/equivalents are: 17.6M U.S. tons / 3.4M cars and 83.77 U.S. tons / 16.4M cars

Senator MARKEY. Thank you, Mr. Hart.

Ms. Dalton.

STATEMENT OF MELISSA DALTON, ACTING ASSISTANT SECRETARY OF DEFENSE FOR STRATEGY, PLANS, AND CAPABILITIES, U.S. DEPARTMENT OF DEFENSE, WASHINGTON, DC

Ms. DALTON. Chairman Markey, Ranking Member Romney, and distinguished members of the subcommittee, thank you for the opportunity to testify today.

May I request permission to submit my written statement for the record and provide brief opening remarks?

Senator MARKEY. Without objection.

Ms. DALTON. Thank you.

It is my pleasure to talk to you about how the Department of Defense is thinking about the implications of climate change, particu-

larly with respect to the Indo-Pacific and the impacts on planning, assets, and strategy in support of a whole-of-government approach.

The Interim National Security Strategic Guidance identified climate change as one of the most significant threats the country and the department faces.

As Secretary of Defense Lloyd Austin has said, no nation can find lasting security without addressing the climate crisis. He described it as an existential threat that poses a variety of risks for U.S. national security.

The challenges posed by climate change are not simply about increased demands for humanitarian assistance. They are also hard security challenges, not least of which are the climate risks to military installations themselves.

In the Pacific, the secretary alluded to the particular risks low-lying island countries face from sea level rise and storms.

For example, the Marshall Islands has an average elevation of just 6 feet above sea level. The country hosts the Ronald Reagan Ballistic Missile Defense test site and the Space Fence Facility on Kwajalein Atoll. These are examples of critical national security sites located in climate-exposed parts of the Pacific.

As the secretary noted, the department has felt the impact of climate change in recent years as extreme weather events have wreaked havoc on a number of our facilities, including billions of dollars in damage to Tyndall Air Force Base in Florida from Hurricane Michael, the effects of flooding on Offutt Air Force Base in Nebraska, and threats to military installations in California from wildfires.

In the Pacific, Secretary Austin mentioned that an unseasonal typhoon in February 2019 forced the pause of humanitarian relief and disaster response training exercises with Australian and Japanese allies.

Deputy Secretary of Defense Hicks has noted the effects of climate change are a national security issue impacting DoD's missions and operational plans, readiness, our installations, and the department's budget. It does this by simultaneously increasing demands on the force while impacting our capacity to respond to those demands.

In light of these concerns, the deputy secretary identified two priorities for the department.

First, we are inculcating a culture of climate-informed decision-making and incorporating climate change into threat assessments, budgets, and operational decision-making.

In addition, we are taking care of our people, including members of the armed forces and the civilians who serve with them by buttressing the resilience of our installations and the structures where people work and live.

Addressing these priorities involves a number of concrete steps. The President's executive order of January 27 tasked the department to lead the interagency in the creation of a climate risk analysis that would assess the security implications of climate change and integrate those findings into strategic documents, notably, the National Defense Strategy.

We are currently finalizing the risk analysis that will meet the objectives of the executive order and inform the ongoing NDS review.

We anticipate that implementation of the climate risk analysis will allow regional combatant commands like INDOPACOM and regional office like OSD Policies Indo-Pacific Security Affairs to assess their vulnerabilities and opportunities for engagement with allies and partners.

DoD is also focused on improving installation resilience. DoD has developed a climate assessment tool, or DCAT, which relies on historical data and future climate projections and will enable personnel at all levels of the department to understand installations' exposure to climate-related hazards.

Within INDOPACOM we have also committed to sharing the DCAT with our South Korean and Japanese allies. We have also recently completed a climate adaptation plan which is intended to integrate climate adaptation and resilience efforts across the department and align these efforts with its warfighting missions.

We have considerable national defense equities in the Pacific related to missile defense and domain awareness, including the Marshall Islands, Palau, and the U.S. territory Guam.

Our integrated air and missile defense system is designed to protect the United States from missile attacks and the freedom to test new technology.

These systems not only contribute to strategic stability and deterrence between the U.S. and China, but also defend against North Korean capabilities and reassure other Pacific allies such as South Korea and Japan.

We also recognize that many of the sovereign states in the region, particularly low-elevation atoll states like Kiribat, Tuvalu, and others face considerable vulnerabilities due to climate change.

We continue to collaborate with our partners in the Pacific to backstop disaster preparedness and humanitarian response to climate-related emergencies through efforts such as ADMM-Plus, the Pacific Islands Forum, and the FRANZ Agreement with France, Australia, and New Zealand.

Going forward, we will be integrating climate concerns into our planning assets and strategy. What form these will precisely take will depend on the outcome of ongoing reviews.

Mr. Chairman, let me conclude by thanking the subcommittee for the opportunity to testify and I look forward to your questions.

[The prepared statement of Ms. Dalton follows:]

Prepared Statement of Ms. Melissa Dalton

INTRODUCTION

Chairman Markey, Ranking Member Romney, and distinguished Members of the Committee, thank you for the opportunity to testify today on the Department of Defense's role in supporting the State Department, USAID, and allies and partners to address the effects of climate change in the Indo-Pacific region.

The Interim National Security Strategic Guidance identified climate change as one of the most significant threats the country and the Department faces.

As Secretary of Defense Lloyd Austin stated in April at President Biden's Leaders Summit on Climate: "No nation can find lasting security without addressing the climate crisis." The climate crisis poses a variety of risks for U.S. national security, beyond increased demands for humanitarian assistance. Hard security challenges, stemming from climate change can threaten the stability of U.S. allies and partners.

Close to the equator, the effects of rising temperatures and extreme weather events are contributing to hunger and displacement in Africa and Central America; exacerbating conditions that can make vulnerable populations susceptible to recruitment and radicalization by extremist groups.

In the Pacific, Secretary Austin has alluded to the particular risks low-lying island countries face from sea-level rise and storms: "In the far reaches of the Pacific, rising sea levels and more frequent and intense storms put individuals, families, and whole communities at risk—while pushing the limits of our collective capacity to respond." Notably, the Marshall Islands has an average elevation of just six feet above sea-level. The country hosts the Ronald Reagan Ballistic Missile Defense Test Site and the Space Fence facility on Kwajalein Atoll. These are examples of critical national security sites located in climate-exposed parts of the Pacific.

The Department of Defense has felt the direct effects of climate change in recent years, as extreme weather events have affected several facilities, including billions of dollars in damage to Tyndall Air Force Base in Florida from Hurricane Michael, the effects of flooding on Offutt Air Base in Nebraska, and threats to military installations in California from wildfires. In the Pacific, an unseasonal typhoon in February 2019 forced the pause of humanitarian relief and disaster response training exercises with Australian and Japanese allies. These delayed multinational exercises impair building interoperability with key allies in the region.

PRESIDENTIAL EXECUTIVE ORDER 14008

The President's Executive Order of January 27, 2021, tasked the Department to lead the interagency in the creation of a Climate Risk Analysis that would assess the security implications of climate change and integrate those findings into strategic documents like the National Defense Strategy (NDS).

The Secretary appointed a senior climate advisor, and tasked him in March 2021 to lead a Climate Working Group across the Department to coordinate the Department's response to the January executive order and track implementation.

The Department is currently finalizing the Climate Risk Analysis to meet the objectives of the Executive Order and inform development of the National Defense Strategy, which will likely be completed early next year.

DOD'S CLIMATE PRIORITIES

In the interim, Deputy Secretary of Defense Kathleen Hicks has previewed how the Department is thinking about and addressing climate concerns. In a May 2021 speech, she noted, "The effects of climate change are a national security issue, impacting DoD's missions and operational plans, readiness, our installations, and the Department's budget. It does this by simultaneously increasing demands on the force while impacting our capacity to respond to those demands."

Particularly germane to the Pacific region, climate change puts our national security at risk by increasing demands for U.S. military-supported relief activities, alongside increased risks of conflict. While management of international river basins has historically been settled peacefully, climate change will stress management of major rivers in the region, such as the Indus, the Brahmaputra, and the Mekong.

In light of these concerns, the Deputy Secretary identified two priorities for the Department:

1. First, the Department is inculcating a culture of climate-informed decision making and incorporating climate change into threat assessments, budgets, and operational decision-making. Our efforts to train, test, and equip the force have to be "climate ready," meaning taking into account climate extremes into training, ensuring that weapons systems can operate under those conditions, and thinking about the logistical challenges of supplying the force amidst changing climate conditions and wider geo-strategic competition with China for energy resources of the future.
2. Our second priority is taking care of our people, including members of the armed forces and the civilians who serve with them by buttressing the resilience of our installations and the structures where people work and live.

The Department anticipates the Climate Risk Analysis will help various DoD components, notably regional combatant commands like USINDOPACOM, to assess their vulnerabilities and to inform cooperation with allies and partners.

The Department is also focused on improving installation resilience. DoD has developed a Climate Assessment Tool or DCAT, which uses historical data and future climate projections to enable personnel at all levels of the Department—from installation planners to leadership—to understand installations' exposure to climate-related hazards. To that end, the Department has also recently completed a Climate

Adaptation Plan, which will integrate climate adaptation and resilience efforts across the Department and align these efforts with its warfighting missions. The DCAT currently assesses a pilot set of global facilities. The Department is working to expand the tool's coverage and functionality. Within the Indo-Pacific region, the Department has also committed to sharing DCAT with our allies, Japan and the Republic of Korea.

The Department is developing additional plans to fulfill other anticipated presidential directives. For example, the Department is writing the 2021 Sustainability Report and Implementation Plan. Since 2010, the Department has conducted an annual sustainability assessment to improve military readiness through resilient infrastructure and business reforms to increase efficiency and reduce costs.

For example, between 2018 and 2020, DoD supported construction of an energy-efficient facility on Wake Island to support test mission management and monitoring which will reduce the environmental footprint—and operational costs. Misawa Air Base will be building a $206 million cogeneration plant, smart grid, and solar arrays to build in redundancy and strengthen resilience in the wake of disasters and dramatically reduce energy use and costs.

The Department has postured considerable defense capabilities forward in the Pacific region, such as missile defense and domain awareness assets in the Marshall Islands, Palau, and the U.S. territory Guam. Our Integrated Air and Missile Defense systems (IAMD) are designed to protect the U.S. homeland from missile attacks. The Department also depends on forward basing in Oceania and the Western Pacific to test new technology. This forward U.S. posture contributes to strategic stability with China, but also supports our allies Japan and South Korean to defend against potential North Korean aggression.

In 2019, in response to the National Defense Authorization Act, the U.S. Navy and U.S. Marine Corps identified several bases in the Indo-Pacific region among their most vulnerable sites, including Marine Corps Base Camp Butler in Okinawa, Japan; Marine Corps Base Hawaii, Joint Base Pearl Harbor Hickam, and Wahiawa Annex in Hawaii; and Naval Base Guam and Andersen Air Force Base in Guam.

Additionally, many of the sovereign states in the region, particularly low-elevation atoll states like Kiribati and Tuvalu, face considerable vulnerabilities due to climate change. The Department continues to collaborate with our allies and partners in the Pacific to prepare for a combined response capability for climate-related emergencies, through efforts such as ASEAN Defence Ministers' Meeting-Plus (ADMM-Plus) working groups on Humanitarian Assistance and Disaster Relief, the Pacific Islands Forum, and the FRANZ agreement with France, Australia, and New Zealand.

CONCLUSION

Moving forward, the Department anticipates the analysis on vulnerability of U.S. installations and wider operations to climate change will inform the Department of Defense's strategy, planning, assets, investments, and activities. We anticipate the 2022 National Defense Strategy will help the Department to better understand its role in addressing the effects of climate change on the U.S. joint force and through its work with allies and partners.

Mr. Chairman, let me conclude by thanking this subcommittee for the opportunity to testify. I look forward to your questions.

Senator ROMNEY [presiding]. Thank you, Ms. Dalton.

I think it is obvious to you that people are coming and going. That is not a sign of disrespect or lack of courtesy. It is the reality that we have votes going on, and so we have to pull out one by one to make sure that we are able to vote.

Let me begin with a couple of questions, first to you, Mr. Buangan, and that is President Xi, during President Biden's April meeting on climate, reiterated the country's intent to peak carbon emissions by 2030 and achieve carbon neutrality before 2060.

How committed do you think President Xi is to those targets and what actions are Chinese leaders taking to actually achieve them?

How much of this is actually been just pushed off to a much later time when all these folks like me will be gone and what is being done now, and how much is being avoided, China reaching these

goals by simply offloading their carbon demands onto other countries in the Belt and Road Initiative?

Mr. BUANGAN. Thank you for your question, Senator.

Yes, that is certainly, something that we are definitely tracking with great interest at the State Department.

It is the fact that China represents almost 30 percent of global emissions in addition to its carbon-intensive investments, we think that it is important to put expectations on the PRC in particular that they back up what they say, what they promise, and what they pledge with concrete actions.

That goes not just for the PRC, but for any country they pledge and they meet the long-term goals that they set.

At the end of the day, we are going to be looking at what Beijing does and not what it says it will do or will not do.

Certainly, President Xi has made many commitments to address the climate challenge on behalf of the PRC that we have yet to see materialize. Those are, certainly, topics of discussion at senior levels in our engagement with the PRC.

Senator ROMNEY. From your perspective, is China continuing to build coal power plants at home and/or abroad?

Mr. BUANGAN. Yes. We certainly are seeing that and I think that given China's reluctance to follow through on many of its pledges. I think the key here is to hold them accountable and to set very specific expectations to follow through on what they pledge and calling out actions that are contrary to what they what they have pledged.

Senator ROMNEY. I simply cannot imagine having an objective that President Xi set for 2030 and, again, for 2016 and at the same time building new coal power plants.

I mean, there are alternatives. Natural gas alternatives. Obviously, nuclear is not one that they are going to seize upon.

Building new coal plants, particularly, ones that not only add carbon dioxide to the atmosphere but also add other pollutants without the kind of scrubbing that we are used to here.

It seems to be incompatible with the objectives that they are setting and it does seem that what they are saying is designed to create a political win for them.

In reality, they do not seem to have much intent to actually make the kind of changes that would result in a reduction in CO2 or growth of CO2 emissions.

Mr. BUANGAN. I think that is right, and I think the responsibility is on us to ensure that as the PRC has pledged, that they follow through on their commitments, as I have said, and that they do not get a pass, which I think they have, certainly, expected.

They are, certainly building the narrative that they are leaders in climate change and reduction of greenhouse gases, and I think the proof is in the pudding.

As you pointed out, the actions that they have taken are contrary to what they have pledged.

Senator ROMNEY. Thank you.

Mr. Pershing, Secretary Kerry has called for climate change to be treated as a compartmentalized issue in the U.S.-China relations.

Yet, I think it is clear to us that that in some respects they cannot be compartmentalized, in part because of China's human rights abuses in the production of solar panels, fuel cell batteries, and even the procurement of raw earths.

So I am wondering can they be separated and treated as separate areas or are they inextricably linked in a way that that we cannot ignore?

Dr. PERSHING. Thank you very much, Senator.

Just a quick comment on your previous question before I answer this one. It does seem that there is some history where China has, in fact, met its commitments, and so I do not want the committee to be thinking that it is only bad.

I agree with you. There is no way they get there if they keep building coal. No way. There is no way they get there if they keep investing in overseas coal.

Historically, they have done more than they have said they would do and they are on a trajectory that would suggest they could still meet their target, this commitment. They exceeded their intensity targets. They exceeded their renewable targets, and it looks like they are not actually using all the coal capacity they are building.

It is kind of an expensive program if you are not ever going to use it, but they are not using it and so it does not lead to very many emissions.

So there is a good question you are raising, but I think there is more nuance that is worth exploring.

With regard to the human rights issues, we completely agree with you it is an appalling state of affairs, and the objective that we have got is absolutely centered on how we address that.

These are not necessarily things that have to be brought together, though. They are things we can distinguish and we can separate out.

We want them to do their climate work and we also want them to stop with the human rights violations and abuses, and we want them to stop with other things they have been doing on other interference globally.

So I think, as we see it, those two things can be pulled apart and we can have a policy in which China moves aggressively and appropriately on climate but also does not have these violations.

Senator ROMNEY. How do you do that with regards to batteries, for instance, and solar panels where we are buying these things like crazy, we are planning out the automotive market, which will be overwhelmingly powered by electric vehicles, and yet these are being produced in places with minority, if you will, slave labor? I will say internment camp labor. How can you compartmentalize those two things when they are so linked?

Dr. PERSHING. So I think there are two parts to that. The first one is that I think we can put in place standards that assure that the places from which we are purchasing those commodities and those goods do not have that labor. It is going to require some work on our side.

The second is to extend the supply chain so it is not reliant on a single player like Xinjiang Province or others who have those constraints. Those could be American jobs. Those could be jobs in

our allies' countries. That could be a supply chain that we build out.

So I think there is an opportunity for us to seize as well as assuring that the chain itself is cleaned up so that we can actually get to the place we want to be.

Senator ROMNEY. Thank you, Mr. Pershing.

Mr. Chairman.

Senator MARKEY [presiding]. Thank you, Senator Romney.

The chair will now recognize himself for a round of questions.

I would like to follow up on Senator Romney's line of questioning, going off of the supply chain issue in terms of these vital component parts that are important to the United States.

We already have a semiconductor crisis in the United States, and if we do not put together a plan and we dramatically expand, as does the rest of the world, in the production of the clean energy sector, we are going to wind up with more problems.

Do you have a recommendation as to how we should handle this supply side—supply chain issue, Dr. Pershing?

Dr. PERSHING. Thanks very much, Senator.

Yes, I think that this is a critical question and I do not think it is a question only for us. I think we have a lot of allies in this agenda.

We are not the only ones who are actively promoting solar. Our European colleagues are doing it. Our Japanese and Korean colleagues are doing it. I had a conversation this morning with our colleagues in Indonesia, who are really interested in this.

All of us want to see opportunities for the access to solar without these kinds of damaging supply chains. We are hearing a lot of interest in expanding those capacities.

At one end, the United States itself has got some dormant capacity. We could bring that online. We could produce some of the things that we need at home.

We are also seeing—and we had some consultations when we were in Saudi Arabia with the Saudis. We have been talking a bit to the Japanese who are looking at other options for financing these things in third countries.

There could be an enlarged supply chain at a global level that would, potentially, compete with or replace the Chinese chain. It will take a few years to get there. We have to do that quickly. We have to invest immediately.

Senator MARKEY. Thank you.

When Speaker Pelosi and I went to China in the immediate aftermath of the Waxman-Markey bill passing, we met with President Hu and Premier Wen. We went through the entire country's leadership for about 8 days.

The key takeaway I took was from one of the key advisors who said to me, the perfect formula is United States innovation and Chinese manufacturing efficiency, and together we will partner to save the planet.

Which sounds very idealistic, but I could see them getting all the jobs and us getting a pat on the back for being so innovative.

We know that we have a problem and it has been there the whole long sad story of all these issues, including semiconductors.

So my question to you is, I know that the Europeans right now are talking about a border adjustment tariff, and just wondering, Dr. Pershing, where you think that fits into a U.S. strategy, especially if we partnered with the Europeans and sent that signal to China and other countries that might seek to exploit the fact that we are going to put very high standards in place.

Dr. PERSHING. So thanks very much for that. I think, as you probably saw, the Europeans have announced the first draft of their strategy. I think it is going to take a lot of work before it is final.

It is so much easier in the context where you either have a domestic price or a cap and trade structure, which you yourself are trying to work on. It makes it simpler to execute.

In the U.S. context where there is a series of complicated and varied measures across the country, it will be somewhat harder to assess how you assign the price and the value for commodities. I think that is work that needs to be done.

At the same time, it is worth considering. We are not looking to disadvantage American companies as we develop a domestic program. So I think that is the balance we have to seek and there is work to be done to evaluate it.

Senator MARKEY. Henry Waxman and I built a border adjustment tax into the 2009 Waxman-Markey bill and Angela Merkel spoke to us about how important she felt it was to have a signal that we were sending.

Ultimately, we have to let them know we are serious at some point in terms of their exploitation of our higher standards, which are going to go much higher if we are able to pass all of the legislation that we are talking about.

Maybe you could tell us where you think are the greatest areas of potential cooperation between the United States and China when it comes to the climate crisis.

Dr. Pershing.

Dr. PERSHING. Thank you. I think we are seeking ones in which the U.S. and China are not competing in the same way because we do not see that is going to play well for either of us.

I do not think we want to be in the position where we lose our technological advantage or where we see commercial opportunities that don't go well.

At the same time, there are, clearly, areas of good practice that we could share, things like how do you manage a city to be more efficient? What do you do about your agricultural practices as you try to feed your people? Things that work in our Farm Belt could work for them. Questions about how you manage resilience, and then how do you work outside of China.

China is making massive investments overseas. We could work on things that would give us an advantage in those third countries that could shape and alter the Chinese trajectory.

Senator MARKEY. One quick question. The Chinese are dismantling a lot of their older coal-burning plants and then reassembling them in Africa and other places, and they are providing these coal-burning old jalopies as though they are doing a favor for those countries because they are so inexpensive.

What should be the message of the United States to China, especially as we are heading into Glasgow, in terms of that kind of behavior?

Dr. PERSHING. I think there are two messages. The first one is that is unacceptable in the context of getting the world on a trajectory to avoid the climate crisis, and China recognizes it is a crisis for itself as well as for the world. That is powerful.

The second message that I think we have to sell is to have some alternative to offer to those countries who are getting a deal from China, and unless we do that, they then look and say, here is a bird in the hand—a Chinese facility, and on the other hand, there is not an option.

I think we have to come forward with the other option. I think we will be competitive with the other option, but it is on us.

Senator MARKEY. I agree with you, but I do not think we should leave Glasgow without that having been resolved, because that is just a very cynical ploy by the Chinese and it has to be unacceptable from Glasgow on.

Let me just stop there and turn and recognize the senator from Oregon.

Senator Merkley.

Senator MERKLEY. Thank you very much, Mr. Chairman. I thank all of you for this testimony.

I am thinking about kind of the general nature of this conversation, which does focus a lot on what China is doing and its financing of more than 200 coal plants around the world.

I wanted to direct my questions to you, Dr. Pershing, because I feel like U.S. leadership is so essential in moving forward in partnership with the world.

I feel there is some things that perhaps the U.S. could consider doing in this coming year that might strengthen our persuasive power, and one is to move more aggressively on our Green Climate Fund obligation.

I think we initially pledged $3 billion and we deposited $1 billion, and the budget calls for an additional, I think, 1.2.

So that $3 billion was a pledge kind of more than 4 years ago and, yet, there is a lot of damage happening around the world from climate and we recognize that the arc of our past development has put a lot of the carbon dioxide into the air.

Should we be more aggressive in striving to fund the Green Climate Fund and in terms of our persuasive power?

Dr. PERSHING. Thank you very much, Senator, for that question. I think the answer is, fundamentally, yes. I do not think we need to do two things.

The first one is that we have made a commitment under Paris, collectively, to try to mobilize $100 billion per year to really work with the developing countries as they seek to mitigate climate and adapt to its risks. The United States share of that has been quite modest and I think it should be bigger.

As to the budget, I think that is up to you. The question that we are looking at is how do we increase both, what the U.S. brings to the table through government funding and how we can leverage that government funding into the private sector, to generate a much, much larger sum.

We need to work on both sides. That means a bit on the World Bank side, a bit on the Green Fund side, a bit on the AID side. It means more for the DFC. It frames a series of opportunities: we can succeed on the climate file while we also work with companies who are going to invest in this future.

Senator MERKLEY. Well, you mentioned the DFC, and the DFC has said that it plans to continue to finance a small number of fossil fuel projects under exceptional circumstances.

It seems to me like that is the sort of place where we could set a better example by saying we will double down on renewable energy solutions in place after place. It is time to stop financing these projects.

Maybe that is the type of announcement that could come during, I do not know, the end of this year or something of that nature, and strengthen the sense that we are committed to this pivot to renewables as we try to persuade others.

Dr. PERSHING. I think there is a lot in that. We are working exactly along those lines. The question is how can you both do big new investments in clean alternatives and scale back on emitting options.

We have to be there for countries on their energy supply side. They know that. We could do that exactly as you have laid it out.

Senator MERKLEY. Another place where I think we could be more aggressive is in the World Bank. The World Bank has made some significant decisions regarding coal. Many diplomats point out that the United States is now more of a natural gas and oil leader and so we are criticizing China over coal.

The World Bank has said and diplomats have told us that the U.S., in its presence in the World Bank, is still encouraging keeping the natural gas track open and it is an example kind of something that might help us because we have natural gas, but does not hold the same moral power than us saying, yeah, we recognize that all forms of fossil fuels you need to pivot on and it is time for the World Bank to stop financing all fossil fuel projects.

Dr. PERSHING. So just two quick comments. The first one is that the International Energy Agency released a report about a month ago in which they looked at how you get to net zero, and they believe that is not necessary to make any new investments in any of the unabated fossil fuel sources—coal, oil, or gas.

We have enough. It also says we have to make the alternative investment. We have to help these countries build their grids, build renewable capacity, and that is the place the bank can go and we are trying to work on that.

Senator MERKLEY. So I hope that we will hear another announcement sometime in a year or so that we are going to use our leverage at the World Bank and all international finance institutions to do an end to the fossil fuel investments.

I am running out of time so I will just end on this note, and that is we have had two major fossil fuel decisions in the last few months.

One was the Willow Project in Alaska, a 300-mile pipeline, massive carrying capacity of that pipeline, and doing a new version of Line 3, which will double the capacity of tar sands, which is perhaps the dirtiest form of fossil fuels in the world.

I will just express my opinion here, but I think it does undermine our persuasiveness in the world to be trying to persuade China to more rapidly reduce its use and to abandon the strategy of doing coal projects around the world while we are still launching new development of major fossil fuel projects here in the United States.

Dr. PERSHING. Thank you. I think there is a good question you raised there. We do see that there is a decreasing willingness on the part of any of the investment houses to make these investments. The risk is too high.

I think the markets will move in the direction that we, as governments, also want it to move. In some of these cases it is not a government decision. It is a private decision. So this kind of tension around what we can demand and what we are seeking to facilitate is hard.

You are right, it makes it harder to make the case globally when we are making different investments at home.

Senator MERKLEY. Thank you.

Senator MARKEY. I just want to reemphasize what Senator Merkley just said. You cannot preach temperance from a barstool.

You cannot be building new pipelines, bringing in the dirtiest oil in the world, and then be going to Glasgow and telling other people it is really bad. You should not be doing it. You have to square up your own actions with what you are going to ask others to do.

Let me turn and recognize the senator from Delaware, Senator Coons.

Senator COONS. Thank you, Chairman Markey, and thank you to this panel and for all of you for the great work you have done over decades, and that you are doing in the current context and current environment.

From the blazing wildfires of the American West to the deadly floods we have just seen in Germany and China, there is no doubt that the need for action on climate could not be greater and we have to do whatever we politically can to address this.

I appreciate Special Envoy Kerry and the Administration's focus on international climate cooperation and new commitments on climate finances, the chairman of the Appropriations Subcommittee responsible for securing funds to meet the commitment to the Green Climate Fund and for the MCC and for DFC and for our international financing commitments. I look forward to your advice and to partnering with you, Chairman Markey, as we move forward.

In the East Asia Pacific region, as we know, as you outlined in your testimony, we both have some of the world's greatest emitters and some of the countries that are most likely to face harm most quickly if we do not get this right.

China, if I understand correctly, is still financing nearly three-quarters of all coal-fired power plants globally and represents 27 percent of total global emissions, and has made a commitment to net zero by 2060, which many of us would agree is insufficiently ambitious and will leave them well behind the trajectory of the rest of the world.

So Deputy Assistant Secretary Buangan, if I might, what tools do we have to work with China, positively, negatively, to provide incentives and pressure to get them to align more closely with our

net zero goals and with the goals that most of the rest of the world will be announcing or moving towards in Glasgow?

Mr. BUANGAN. In terms of what the Administration is doing, we have the senior leadership engagement ongoing. I think, with respect to China, it is, certainly an issue that we are addressing.

You saw the Administration's recent actions that we have taken with respect to Xinjiang forced labor and the solar supply chain, which we talked about earlier.

Senator COONS. Mr. Hart, if you might want to also pitch in on what are the tools available to the Administration to try and move the Chinese closer to our position, I would appreciate it.

Mr. HART. Senator, thank you. I want to comment a little bit about, really, working with our host country governments to be able to work with our partners to under—because they want to understand how do they go about engaging on this issue, and they need a lot of——

Senator COONS. If I am not mistaken, you actually had experience doing this in Tanzania. Am I correct? Where this was actually—did I not see you previously in Tanzania?

Mr. HART. We sure did. Yes, sir. Yes, sir. Yes, exactly. That is exactly where we saw each other.

Indeed, in Tanzania and my last 4 years in Vietnam, these countries need assistance in terms of being able to assess what is coming at them, and there is a lot coming at them in terms of offers.

I think there is a lot of good, great work that we can engage there when it comes to being able to understand the technical expertise aspect of it, being able to understand the democracy and governance in terms of actually putting out tenders for these.

That is a critical aspect, and a lot of the countries do want to have those high-quality infrastructure systems come in such as an American company could provide. The requirement——

Senator COONS. Mr. Hart, my assessment would be that Power Africa actually was at its most successful, had its greatest impact in that space, helping design projects, helping with tenders, helping with transparency, frankly——

Mr. HART. Absolutely.

Senator COONS. —and did not provide the robust financing that many countries were looking for. That is why I worked hard with a group of members of the House and Senate to then build the DFC so that there was a financing vehicle available. I would argue it is still under resourced, but at least there is now those two.

Would you argue for expanding the Power Africa approach to other regions—Central, South America, and Southeast Asia?

Mr. HART. I think we have definitely utilized your design very well in terms of being able to connect and do the matchmaking that is required.

Our staff are there working with folks on a day-to-day basis, and that is what they need to be able to develop the trust that is required to actually reach out and better access some of these financing tools.

So we have looked at Asia Edge, for example. That is a great example of how we have been able to work with the private sector, who is very interested also in terms of meeting some of these clean

energy goals as well, those who are producing clean energy and looking at direct power purchase agreements as well.

Figuring out the complexity of it is making sure that all the stakeholders are at the table and that the trust is built over years, quite frankly.

Senator COONS. Thank you. If I might—forgive me.

Dr. Pershing, on a border carbon adjustment, the EU is actively implementing Canada and the U.K. are seriously discussing and preparing. I think it is likely that we will move forward with a border carbon adjustment in some version in our reconciliation bill.

I introduced a bill on Monday with Scott Peters that would require the Administration to come up with an assessment over the next 2 years of exactly what the regulatory price is—this is in the interim until we have got a price on carbon—and then would assess that on a variety of imports—steel, iron, aluminum, cement, natural gas, petroleum, coal—where it is relatively easy to assess the carbon intensity of those products, and then use the revenue raised for state grant programs for resilience assistance to small businesses, energy assistance, energy innovation.

I think it is a great way for us to pull together with countries that share our values, allies on both open societies and on carbon ambition. Some have criticized it already in the press. It has raised questions, both positive and negative.

I would be interested in your views about both how we could most successfully implement a border carbon adjustment and how the Administration is approaching the reframing of trade around climate values and climate ambition.

Dr. PERSHING. Thanks very much, Senator. That is a lot of questions, all which I think are central, and we have only had a chance to really begin to look at the bill that you have proposed, the structure that you proposed in the act.

I think there is a lot in that that is very, very much aligned with the thinking we have been doing.

Two things. The first one, it is very clear you do not want to disadvantage American companies as you do the climate policy work; we do not want to be in a position where others act with impunity while we bear high transition cost.

I say it is going to be a transition cost because I think there is a value in moving first. First, movers often get to own the market, and I think that market is coming. There is, potentially, a transition cost.

The second, though, is one you have just outlined and it is around the complexity of the arrangements. They are really not straightforward, and I think we just had a little bit of an exchange with Senator Markey about some of the early work that he had done around a pricing mechanism, which makes it much easier.

There are ways, however, in my mind (and in our collective thinking) where you do not need a price mechanism but you can still assign value and differentiate between what it costs an American to make something and an overseas actor.

I think that is where your bill is proposing to go. I think we need to do further studies on it. I would like very much to follow up with you and your team as we do that work and that analysis.

It is in our remit to take that forward. The President has asked Special Envoy Kerry to lead part of that assessment. So we will be working on it, and look forward to talking to you about your vision.

Senator COONS. Thank you, and I look forward to working with you on that as well.

As Senator Markey well knows, emissions do not respect borders, and he has been hard at this work for quite some time. I look forward to partnering with him in the months ahead as we get ready for Glasgow, and I appreciate the continued partnership with the Administration and what each of you is doing to help lead in this critical area.

Thank you, Chairman Markey.

Senator MARKEY. Thank you, Senator Coons. My view is that if we do not partner with Europe on this in our relationship with China in Glasgow, we just wind up as Uncle Sucker.

We have to have a plan for what is happening in their production strategies and we have to understand that unless they know that we are firm and we have a plan that they will just continue to run with it.

The United States wins whenever we have a plan. If we do not have a plan, they will win. So let us try to work together, and I am so glad that Senator Coons is working on this issue.

There is some formulation here that can work, and if done in conjunction with the Japanese and the Europeans I think it sends a very powerful message to the Chinese.

Let me ask you, Mr. Buangan, given the United States' absence in the fight over the last 4 years during the Trump years, what do you think is the best thing we can do as a nation to signal to all of those East Asian nations, those Pacific Islanders, that the United States is back in the game?

Mr. BUANGAN. Thank you, Senator.

I think this Administration is starting to do it by being present and speaking out forcefully and prioritizing the Indo-Pacific as a national security priority for this Administration.

As you see in the press, Deputy Secretary Sherman is currently in the region. She is engaging with our partners and allies, and she has just announced today that she is going to be visiting the PRC.

There is a healthy amount of diplomacy going on there. I think that being present both in the bilateral and multilateral space as we are returning to many of our multilateral engagements is key, and it is also, I think, helping those countries that are most affected by climate change meet those demands, and matching our words with our actions and doing the things that we say that we are going to do and say that we are going to pledge.

So you mentioned the Pacific Island countries as an example. A lot of these countries view climate changes as an existential threat. We are recognizing that many of those countries are hard hit by climate change.

We have announced many initiatives to help them mitigate that, for example, the International Climate Finance Plan, which is intent on doubling our annual public climate finance to developing countries by 2024.

The Administration has also launched the Small and Less Populous Island Economies Initiative, or SALPIE, which is an economic

cooperation framework. So it is actions that also help these countries meet these challenges.

Senator MARKEY. I agree with you, and that is why I brought this picture. If you are a Marshall Islander and you see what we left behind after 67 nuclear tests, just a huge dome carrying all of the waste from 67 nuclear blasts, transporting from Nevada all that nuclear waste and putting it right there, now you can see the rising tide sits around that dome, which is weakening.

If you want to talk about recombinant environmental nuclear DNA being just spewed across the Pacific—that is the situation. They have a right to expect us not to further contribute to the likelihood that that day is going to arrive.

Mr. Hart, what would be your recommendation in terms of what our message is to these Pacific Islanders? What more should we be saying to them in terms of climate mitigation and adaptation efforts in the Pacific Islands?

Mr. HART. Thank you, sir. I very much agree with my State colleague. I think that showing up makes a difference.

USAID has actually increased our presence by three fold in the Pacific Islands in the last couple of years. We have increased our assistance in terms of development assistance as well as emergency assistance by four times, thanks to your support.

I think showing up, making sure that we have that on-the-ground collaboration, that we are developing those absolutely essential trust relationships, because that trust and that relationship is going to be the answer when there is the next decision to be made.

Illustrating our presence, illustrating our connectivity with their priorities, not just with the host governments but also with civil society. As we know and as you have pointed out, sir, those who have to smell the air of a coal fire plant are quite not interested in pursuing that any further.

Governments listen to that frequently, and so engaging not just our private sector counterparts, who are very interested in pursuing some of these green climate goals themselves, not just our host country governments who have their own goals, but also ensuring that we are engaging civil society in this discussion as well because they can bring a significant amount of influence to bear.

Thank you, sir.

Senator MARKEY. Thank you.

Ms. Dalton, the Targeting Environmental and Climate Recklessness Act is something that I reintroduced, which brings the full weight of U.S. sanctions against those who perpetrate human rights abuses against environmental defenders.

Can you talk a little bit about what the role should be for the United States to play as this human rights defender, especially when we are talking about environmental abuses that are occurring in countries and our moral and political weight that is needed to leverage the indigenous groups that are seeking to protect themselves and their livelihoods?

Ms. DALTON. Senator, thank you for the question.

I am going to request to take that question for the record as it relates to that specific act.

Broadly speaking, in terms of DoD engagement in the region, given our strong network of alliances and partnerships, certainly, the Biden/Harris administration prioritizes the value of good governance and human rights.

So when it comes to our security cooperation relationships, the provision of security sector assistance, it is a strong criteria that we use to evaluate whether to provide assistance and, certainly, to monitor how that assistance is used over time, sir.[CONTINUE HERE]

Senator MARKEY. Let me ask you this. Corrupt authoritarians throughout the region, including the military junta in Burma and the Kim family in North Korea, use fossil fuel revenues to support their regimes.

How can the United States act to prevent corrupt petro regimes from stymieing climate progress?

Ms. DALTON. Senator, again, I am going to have to take that particular question for the record. Thank you.

Senator MARKEY. Great. I would appreciate it. Thank you. I appreciate your expertise on this issue.

Dr. Pershing, do you have any recommendations as to how we should handle that issue in terms of the corrupt nature, unfortunately, in too many countries of the petroleum/natural gas industries?

Dr. PERSHING. So I have maybe a story that is not quite a direct answer but a connected answer. We spent some time in the last month or so traveling and meeting with various other partners around the world, and one of the countries that we went to was Saudi Arabia.

This is a country that has had some serious, long-standing, and probably unique requirements around fossil fuels. That resource pays for something like half of their entire government budget and there is, clearly, some degree of internal royal family dynamics in their operational structure.

But one of the things that I found when we were there is that they are willing to think about a shift in their policy. They are willing to think about alternative models for development.

They are working, in fact, to think more about hydrogen, and creating a much more diversified economy. They are thinking about solar, which would further diversify their economy, and would change the outcome in a fundamental way.

To me, part of what we have to do is we have to wield the stick but we also have to have the carrot, and a carrot might be in the way that we can offer them an alternative model of growth and development.

And if we do that, at least the experience just from this last trip suggests that we would have an audience and might get a transition.

Senator MARKEY. Great. I appreciate the expertise of this panel. I am going to ask each one of you just to give us a 30 seconds piece of what you want us to remember from this panel as we are moving forward with crafting legislation or foreign policy.

We will begin with you, Ms. Dalton. What is the 30 seconds you want us to remember?

Ms. DALTON. Thank you, again, for the opportunity to testify today.

I think what I would stress is that while there are significant requirements for humanitarian assistance and disaster relief in supporting our allies and partners in the region and building their partner capacity, there are hard security challenges, too, that we need to keep in mind in terms of the ability to sustain access spacing and over flight requirements for warfighting and deterrence in the region.

So the department is committed to taking a holistic look at how we can support a whole-of-government approach to address these challenges.

Thank you.

Senator MARKEY. Thank you.

Mr. Hart?

Mr. HART. Oh. Thank you, sir.

Thank you very much for the opportunity to testify.

I would say that USAID's presence in country makes a huge difference. It is the relationship upon which we build our trust and we also are able to engage the host country governments.

We are also able to work with civil society to ensure that those institutions are the ones that have voice in this process.

We are also able to work upstream, and that is developing the higher education institutions that are going to produce the workers of the future and being able to look at some of those very critical business-enabling environment factors that are going to allow American companies to come in and compete on a level playing field.

I think that is absolutely critical for the overall solution set within this topic and many others.

Senator MARKEY. Thank you.

Mr. HART. Thank you.

Senator MARKEY. Mr. Buangan?

Mr. BUANGAN. Thank you, Chairman, for having the opportunity to testify before you today and engage in this discussion.

I think for the State Department our challenge is trying to meet the Administration's goals of our Indo-Pacific strategy and what we are trying to do in terms of our U.S. leadership, asserting U.S. leadership, a positive and affirmative vision of U.S. leadership in the region, and that is going to require resources.

We are, certainly, engaging our allies and partners and giving them the tools that they need to address and mitigate the effects of climate change. It is going to take not just diplomacy but public diplomacy.

Mr. Hart mentioned engagement with civil society. We do that every day in the State Department through our embassies and our consulates in the region.

So being able to meet those challenges with the right resources and the right people to be able to do that in the region.

Senator MARKEY. Thank you, Mr. Buangan.

And Dr. Pershing?

Dr. PERSHING. So three things.

I think we have to walk the talk. You cannot just say what you want. You have to deliver, and that means here at home.

The second thing, we need to partner on the ground. We have got to be present. That means through commercial endeavors, through financing, through technical assistance.

And the third thing, we have to lead with a vision. We have to have a vision of the world as it could be and go down that pathway with allies.

Senator MARKEY. I love it. Walk the talk. Partner on the ground. Have a vision of the future that the rest of the world can buy into.

That is a big order, but the United States is up to it, and we thank all of you for all the great work you are doing towards the goal of achieving that.

Thank you all so much. The first panel is excused. We will move on to our second panel.

Senator MARKEY. Our second panel consists of Marinel Sumook Ubaldo, who is a climate activist from the Philippines, Richard Powell, who is executive director of ClearPath, and Sherri Goodman, General Secretary of the International Military Council on Climate and Security.

We welcome the three of you, and I think we can start with Ms. Ubaldo. I know she is up on the screen and she is going to be testifying remotely. If we have the technological capacity to link us to her, then we can begin this second panel.

[Pause.]

Senator MARKEY. While we are doing that and get that set up, why do we not turn to you, Mr. Powell?

Introduce yourself and then in five minutes please summarize your testimony.

STATEMENT OF RICHARD POWELL, EXECUTIVE DIRECTOR, CLEARPATH, WASHINGTON, DC

Mr. POWELL. Good afternoon, Chairman Markey, and members of the subcommittee.

I am Rich Powell and I lead ClearPath. ClearPath advances policies to accelerate breakthrough innovations that reduce emissions in the energy and industrial sectors.

An important note, we are supported by philanthropy, not industry. Climate change is real and industrial activity around the globe is the dominant contributor. We believe the challenge it poses to society merits significant action at every level of government and the private sector.

I have spent my entire career working on climate change solutions, including my time working with energy companies and governments in Indonesia, Malaysia, and Singapore.

Jakarta, Indonesia, which I have called home, is a relevant case study. Given its proximity to low-lying rivers, extreme precipitation, a rising sea, rapid growth, and over extraction of groundwater, the city is, literally, sinking.

Indonesia is made up of highly-populated islands and some of the largest remaining rain forests in Southeast Asia. It is rich in people and culture and quite poor in open available land. That makes relying heavily on land-hungry clean energy, like wind and solar, entirely unrealistic as it is for much of the region.

To further complicate matters, Indonesia is also rich in coal, and developing countries continue to turn to coal as it remains cheap, abundant, and reliable.

This is a microcosm of the wider region. Given your role and America's response to the global climate challenge, I will discuss three key topics.

First, the global emissions landscape. Asian emissions, driven by China, could eclipse America's emissions efforts.

Second, an innovation-driven policy agenda to cut the cost of clean technologies for developing countries.

And third, opportunities to build on your strong bipartisan clean energy innovation priorities.

U.S. lawmakers, Republicans and Democrats, and businesses are prioritizing climate solutions. But while the U.S. reversed our emissions trajectory, much of the rest of the world is growing their emissions as they grow their populations, industries, and quality of life.

To remain competitive with China, U.S. energy policy must synchronize with the global challenge. Even if the U.S. somehow eliminated all of its carbon emissions tomorrow, just the growth in emissions from today through 2050 by developing Asian countries would exceed total U.S. emissions today.

Unfortunately, today's clean technology is not up to the task of global economy wide de-carbonization. We need to focus on breakthrough technologies that offer both better performance and lower costs than the traditional emitting technologies in the market.

China is not making this challenge easier. Greenhouse gas emissions in China tripled between 1999 and 2019, and accounted for 27 percent of global emissions in 2019, more than the entire developed world combined.

Looking ahead, China has only committed to stopping new coal by 2026, locking in those emissions for decades to come. China is also the largest public financier of coal plants globally, but its overseas support is dwarfed by its own domestic development.

Last year, China brought 38 gigawatts of coal online, more than three times the rest of the world combined. China's Belt and Road Initiative makes it very cheap and straightforward for developing countries to electrify their economies by building new coal plants.

Leaders in these nations would likely prefer to build clean energy, but their top priority is getting electricity turned on. So new subcritical coal plants and outdated extremely high-emitting, inefficient, but very cheap technology are what they often choose, and China helps pay the bills.

Meanwhile, our export credit agencies are lagging. By statute, Ex-Im is only empowered to prioritize clean investments in renewables and energy storage. As Dr. Pershing also suggested, we can assemble better packages that offer like for like substitutes to the subcritical Chinese coal plants like advanced nuclear or natural gas with carbon capture.

A no-regrets policy shift would be to expand the Ex-Im transformational exports program to put all clean energy on the same footing. The United States can truly lead on reducing global emissions. But there is no tax or domestic regulation that will magically halt emissions around the world.

We must focus on strengthening the American economy, not ceding ground to China or Russia. There is a path to reducing global CO2 emissions and creating new American jobs. It is a simple four-step plan: innovate, permit, build, and then export.

First, we must innovate. This means developing clean technologies the world wants to buy that give America a competitive advantage.

Second, we must eliminate unnecessary regulatory hurdles that slow down permitting innovative technology. To that effect, I would like to draw your attention to the findings of the recent bipartisan Aspen Institute "Cleaner Faster" Dialogue.

Third, we must demonstrate how the technology works. If we do not see American innovations through from R&D through commercialization, our basic research here is only welfare for China. They have proven they will take our innovations and run with them, as you mentioned earlier, Mr. Chairman.

And, fourth, we must export the proven U.S. technology and create new clean energy markets. Innovations must work not only in America but also apply to Myanmar or Malaysia, given their development goals.

As you craft this agenda, and I cannot underscore this enough, partisan climate policy is not sustainable. It results in short-term uncertainty and does not provide the market signals we need to move to a clean energy economy.

We can start by building on recent bipartisan wins. In addition to the bipartisan authorizations in the Energy Act of 2020, the most recent fiscal year '20 and '21 appropriations bills are great successes.

Investments for clean energy demonstrations for carbon capture, advanced nuclear, grid scale long-duration energy storage, enhanced geothermal, hydrogen, and direct air capture should remain at the core of any bipartisan policy.

Thank you for this opportunity. We applaud the committee for taking on this important task.

[The prepared statement of Mr. Powell follows:]

Prepared Statement of Richard J. Powell

Good afternoon Chairman Markey, Ranking Member Romney and Members of the Subcommittee. My name is Rich Powell, and I am the Executive Director of ClearPath.

ClearPath is a 501(c)(3) organization whose mission is to develop and advance policies that accelerate breakthrough innovations that reduce emissions in the energy and industrial sectors. We develop cutting-edge policy solutions on clean energy and industrial innovation, and we collaborate with public and private sector stakeholders on innovations in nuclear energy, carbon capture, hydropower, natural gas, geothermal, energy storage, and heavy industry to enable private-sector deployment of critical technologies. An important note: we are supported by philanthropy, not industry.

Climate change is real and industrial activity around the globe is the dominant contributor to it. I believe the challenge it poses to society merits significant action at every level of government and the private sector. Unfortunately, climate change is best thought of as a chronic condition of the planet, and will require continuous innovation, smart policymaking and voluntary action, and resilience building every decade of this century to address.

I have spent my entire career working on climate change solutions, including my time living in the Asia Pacific region in Indonesia, Malaysia and Singapore, working with energy and resource companies and local governments on their sustainability goals.

Jakarta, Indonesia, which I called home several years ago, is a particularly relevant case study for the need to act, and act thoughtfully, on climate change. The metropolitan region of Jakarta, the capital, is home to more than 33 million people as of 2020, making it the second most populous metropolitan area on Earth after Tokyo. Given the proximity to several low-lying rivers, a rising sea, rapid growth and development, and over-extraction of ground-water, the city is literally sinking and prone to severe flooding. More than 70 percent of the city was submerged during the 2007 monsoon.[1] This year, thousands have already needed to evacuate the city due to flooding, which is part of the reason their government is in the process of moving the capital to a different island.

There is no silver bullet solution for stories like this. Maintaining a thriving megalopolis like Jakarta will require deep investments in resilient infrastructure, stronger urban planning, and better technology to limit and eventually reverse global climate change. Just as importantly, better clean energy solutions are needed to eliminate the urban air pollution which continuously shrouds the city. Meeting all of these challenges, while continuing the rapid development of South East Asia's largest economy, soon likely to overtake the U.S. as the world's third most populous nation, will require technological breakthroughs. For one thing, 275 million Indonesians live across 6,000 islands in the world's most populous archipelago. Population density there is four times as high as in the U.S. The most populous islands like Java are extremely densely settled, and the less inhabited parts of many other islands are home to the largest remaining rainforests in Southeast Asia, a global treasure trove of biodiversity. In short, Indonesia is incredibly rich in people and culture and quite poor in open, available land—ensuring a clean energy future for Indonesia will rely heavily on power-dense clean technologies—advanced nuclear, fossils with carbon capture, hydrogen, and enhanced geothermal—only under development today. Relying entirely on existing high land use variable carbon free energy like wind and solar is entirely unrealistic in Indonesia, as it is for much of the rest of the Asia Pacific region.

To make matters more complicated, Indonesia's islands are rich in coal. The country is the second largest coal exporter by value on the planet,[2] and its share of power generation from coal continues to grow in both absolute and relative terms (now at roughly 60 percent) as it rapidly electrifies its economy.[3] Despite the continued cost improvements in wind and solar, countries with high population density and abundant coal looking to rapidly electrify continue to turn to that power source as it remains cheap, abundant and reliable.

The climate challenge for Indonesia is a microcosm of the wider region. Given this subcommittee's role in America's response to the global climate challenge and efforts to examine increasing carbon dioxide emissions in China, Southeast Asia and the Pacific, I will discuss three key topics today:

- *The global landscape* shows rapidly increasing carbon dioxide emissions. Increased emissions from China and the developing world, including a number of Southeast Asian nations, will eclipse all of America's efforts to decrease emissions. Solutions must be globally focused and must keep American competitiveness with China in mind.
- *An innovation-driven agenda* is the way to solve the global emissions challenge by scaling up clean energy technology so the developing world chooses clean energy as an affordable option. The four-step strategy to achieve this and maintain American energy leadership is simple: innovate, permit, build and export.
- *Building on the strong bipartisan clean energy innovation record* investments and authorizations we have seen over the last several Congresses.

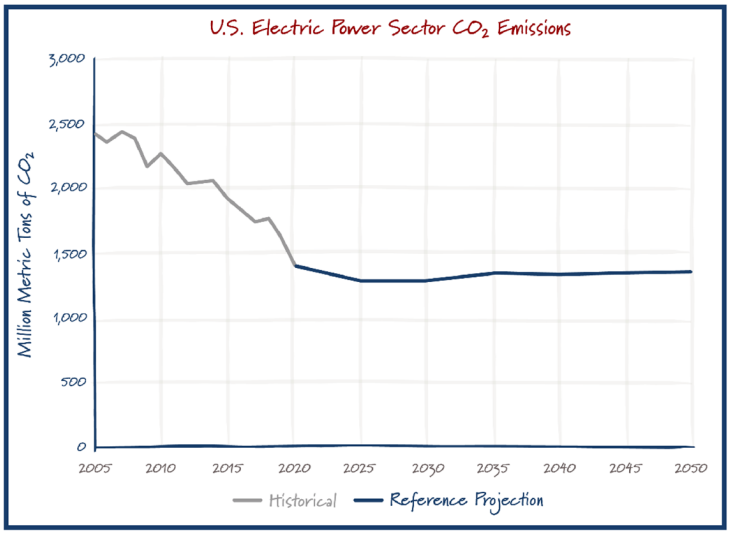
THE GLOBAL LANDSCAPE

There is good news and there is bad news. The good news, lawmakers—both Republican and Democrats—and businesses across the U.S. are prioritizing investments in climate change solutions.

The bad news: while the U.S. and a few other leaders have reversed our emissions trajectory, much of the rest of the world is growing their emissions as they grow their populations, industries, and quality of life.

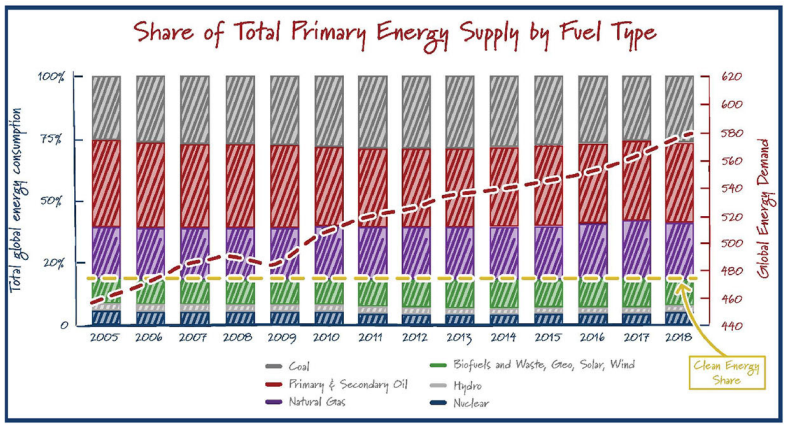
That's why as the Committee considers policies to remain competitive with China, it is important that U.S. energy policy synchronizes with the global nature of the climate challenge. Reducing American emissions is essential, and we have seen a significant decline already. Since U.S. emissions peaked in 2005, power sector emissions have fallen by roughly 40 percent as of 2020, largely due to the abundance of cleaner natural gas and resulting coal to gas power switching, as well as an increase in renewables.[4] But, even if the U.S. somehow eliminated all of its carbon

emissions tomorrow, just the growth in carbon emissions from today through 2050 by developing Asian countries (e.g., China, India, and other Eastern Asian nations) would exceed total U.S. emissions today.[5] Going forward, we expect power sector emissions in the United States to flatline if natural gas prices remain low, and more action is required to ensure emissions continue to decrease here at home.



Data based on ClearPath analysis

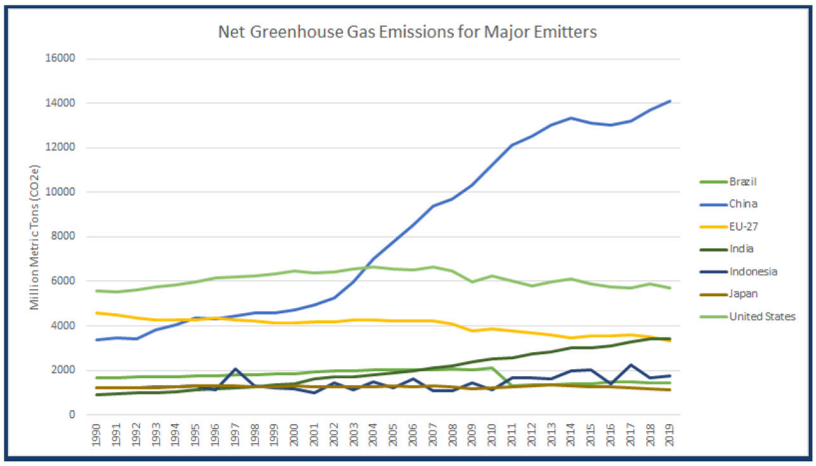
However, clean technology available today is simply not up to the task of global economy-wide decarbonization. As the chart below indicates, the global supply of clean energy has remained stagnant since 2005. We need to focus on breakthrough technologies that offer both better performance and lower costs than the traditional emitting technologies in the market today—only then should we expect to truly change this trajectory.



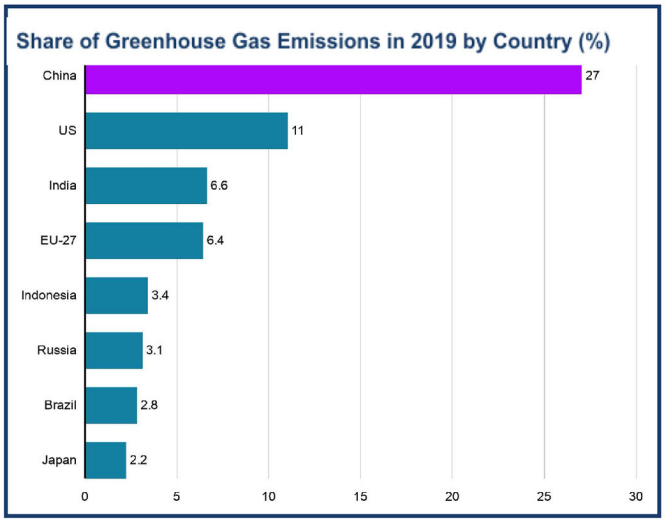
Sources: IEA World electricity generation mix by fuel, 2020; BP Statistical Review, 2020

China's Belt and Road Initiative—their commitment to global infrastructure finance and development to tie together a huge swatch of the developing world—is currently hugely outpacing all U.S. America export credit and development finance

activity. Among many other things, including clean energy technologies, China continues to finance new sub-critical coal plants—an outdated, extremely high emitting, inefficient but very cheap, coal technology—around the developing world.



Net Greenhouse Gas Emissions for Major Emitters[6]



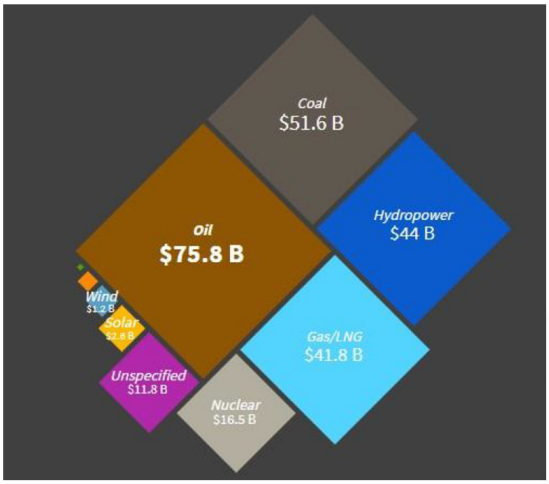
Share of Greenhouse Gas Emissions in 2019 by Country[7]

We can all agree that China has a big emissions problem. Greenhouse gas emissions in China tripled between 1999 and 2019, and accounted for 27 percent of global emissions in 2019, more than the entire developed world combined.[8] Looking ahead, Chinese coal emissions have not yet peaked, and new coal plants are still under development through 2026, locking in those emissions for decades to come.[9]

CHINESE PUBLIC FOREIGN ENERGY INVESTMENT

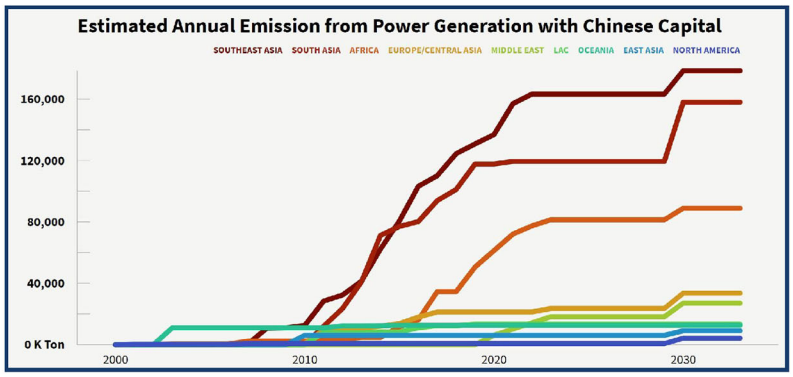
China is the largest public financier of coal plants, and is one of the few countries financing overseas coal plants generally.[10] As demonstrated below, the vast majority

of Chinese energy investment overseas has been in emitting technologies, with only a fraction going to non-emitting technologies.



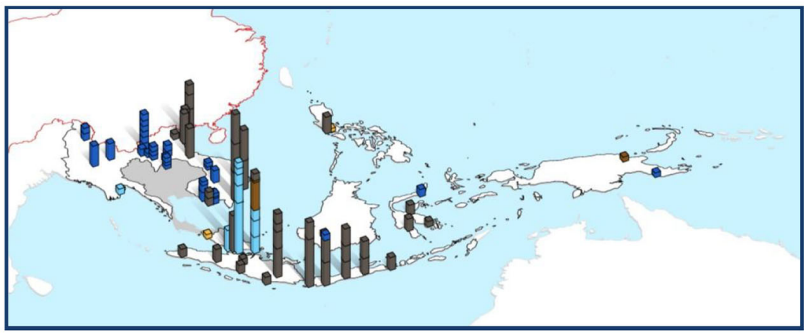
Total Chinese Public Overseas Energy Finance by Technology, 2000-2020[11]

The total emissions from Chinese publicly supported coal projects since 2000 is 433 million metric tons of CO2 per year. If the average life of a coal plant is approximately 40 years, this investment represents 17 gigatons of carbon emissions.



Estimated Annual Emission from Power Generation with Chinese Capital by region, 2000-2030[12]

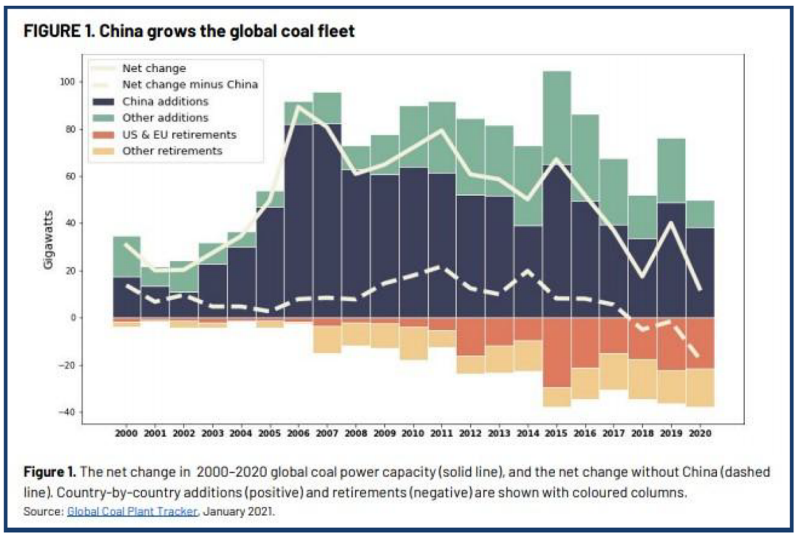
Within the Southeast Asian region generally, China has been a major financier of coal projections. The map below shows Chinese investment in energy projects between 2008 and 2022 in Southeast Asia. In total, Chinese financial entities supported the development of 27 gigawatts of coal capacity in Southeast Asian countries alone.[13]



Map of Chinese Energy investment in Southeast Asia, 2008-2022[14]

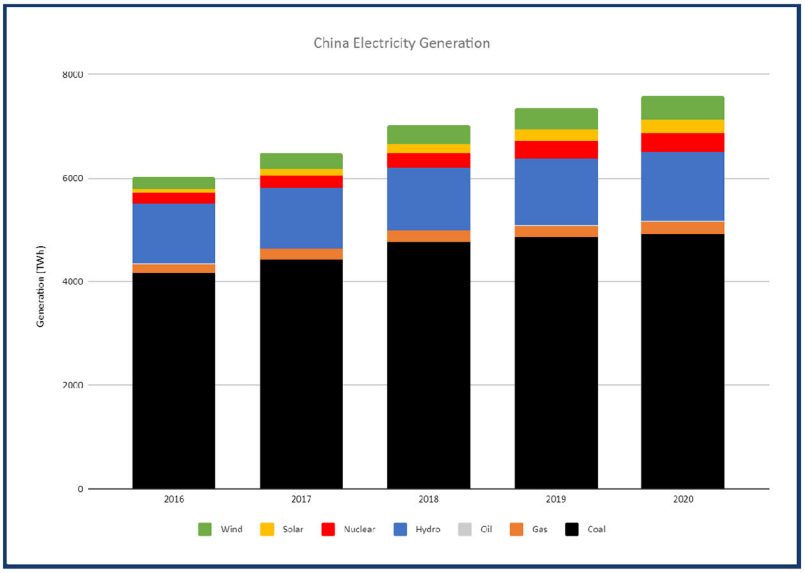
CHINESE DOMESTIC INVESTMENT

China's overseas support is dwarfed by its own domestic development. In 2020, while much of the rest of the world was targeting its covid-related stimulus spending towards clean technologies, China brought 38 gigawatts of coal online, more than three times as much coal as was brought online in the rest of the world combined.[15]



China Grows the Global Coal Fleet[16]

While China may technically lead the world in solar[17] and wind[18] capacity additions (which may not be entirely accurate[19]), because those plants operate at only a fraction of coal's capacity factor, actual renewable energy generation is dwarfed by fossil energy generation. The graph below shows China's continuing reliance on coal in the electric sector.[20]



Data is sourced from BP's statistical review of world energy, 2021.

AN AMERICAN INNOVATION-FOCUSED APPROACH TO GLOBAL CLIMATE CHANGE

Too often these sobering statistics on the rise of emissions in the rapidly developing world have been used to argue against rigorous American action to combat global climate change. We argue just the opposite—rather than a shield against action, these realities must spur us to great ambition. But unless we keep these realities in mind, we risk pursuing a climate change and clean energy policy that will do more harm than good.

The number one reason for the increase in coal production in these countries is very simple—China's Belt and Road Initiative is making it very cheap and straightforward for them to electrify their economies by building new coal plants. Ask a leader from any of those nations working hard to provide for their people, and they will probably tell you they'd love to build clean energy, but their top priority is getting electricity turned on for their citizens and their industries.

Meanwhile, our export credit agencies are lagging far behind. The Program on China and Transformational Exports at the ExIm Bank, where I've been proud to serve on the Advisory Committee since 2019, for example, only authorizes a specific additional focus on renewable technology and energy storage. The program does not focus U.S. export credit on technologies that could offer a real like-for-like substitute to subcritical coal plants, e.g., nuclear technology or natural gas with carbon capture. So, because we have not provided realistic alternatives, these nations are naturally choosing cheap Chinese coal technology.

An absolute no-regrets policy shift would be to expand the ExIm energy program to include all clean energy sources—like nuclear, natural gas and coal with carbon capture, and enhanced geothermal—so we put all clean energy technologies on the same footing and enable more financing options for key technologies. Senator Kevin Cramer (R–ND) is working on legislation that would address this challenge and put all clean energy technologies on a level playing field.

The United States can truly lead on reducing global carbon dioxide emissions. But, there is no tax or domestic regulation that will magically halt emissions in China or the rapidly developing world. We need a plan that can make our energy sector cleaner and more reliable here in the U.S., and also around the globe. And any plan should also focus on making the American economy even stronger—ensuring American energy leadership and not ceding ground to China, Russia or other nations looking at clean energy markets.

This plan puts us on the path to achieve the global CO_2 reductions we need, and create new jobs around the U.S. It's a simple four step plan: innovate, permit, build and export.

1. First, we must innovate. That means developing clean technologies the world wants to buy that give America a competitive advantage. Big energy projects can't be done in someone's basement funded by a small angel investor like a new food delivery app. They are obviously large and capital intensive efforts, and we must drive progress with public investments in close partnership with the private sector, with very clear accountability at the Department of Energy to produce huge cost and performance improvements. Our recent moves towards technology and performance goal-based programs, for example DOE's Advanced Reactor Demonstration Program, and the new Earth Shots initiatives on hydrogen and storage, the latter carrying forward the Trump administration's Energy Storage Grand Challenge, all follow this formula.
2. Unnecessary regulatory hurdles that needlessly slow down innovation must be eliminated. There are proposals to make important reforms to the National Environmental Policy Act, the Nationwide Permit Program and to streamline the cumbersome New Source Review process for emission reducing technology retrofits. Most recently, the Aspen Institute released the results of a bipartisan round table led by Bill Clinton's former head of CEQ Katie McGinty and George W. Bush's former head of CEQ James Connaughton.[21] I would encourage the members of the subcommittee to review this report and work towards the recommended solutions. The efficient permitting of projects is essential to the efficient use of scant taxpayer resources and to scaling clean energy deployment rapidly. We can only reduce CO_2 emissions as fast as we can permit new projects.
3. We must demonstrate how the technology works and build it. Dozens of U.S. utilities have committed to reach "net zero" emissions by 2050. Working backward from that goal, they will need to build new zero-emitting 24/7 technology by 2035. Let's work with them, not against them. The bipartisan Energy Act of 2020 was an amazing start, including authorizing bills to cost-share federal demonstration programs, incentivize new demonstrations via tax credits, and smooth the regulatory path to deploying these at scale. However, if we don't see these amazing innovations through, from R&D to commercialization, our basic research will be creating a welfare program for China, who is happy to take our breakthroughs and commercialize them in their markets. They have proven they will take our energy innovations and run with them.
4. And finally, we must be able to export the proven technology and create new clean energy markets. Everything we are innovating and demonstrating must not only have a niche in our own energy sector, but also apply to countries like Myanmar or Malaysia that are growing exponentially—and consider what U.S. technology best fits their development goals.

To do this, we need to leverage the U.S. trade and development agencies, like Export Import Bank and the U.S. Development Finance Corporation. Each of these agencies offers robust financing options for technologies important to the developing world and due to the size of energy projects, almost every major project requires financing backstops from the exporting country. Cementing the mission of clean energy exports and development in these agencies by law will go a long way to building new clean energy markets globally for American products. This will further ensure that future energy projects in developing countries emit less and eliminate forced labor, particularly as it relates to current human rights violations throughout the existing supply chain in China.

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

STRONG BIPARTISAN CLEAN ENERGY RECORD

Finally, I cannot underscore this enough, partisan only climate policy is not sustainable. It results in short-term uncertainty and does not provide the market signals we need to move to a clean energy economy. We must work to have sustainable climate policy that includes the buy-in from both political parties in congress.

We can start by building on recent bipartisan support for all these exciting opportunities for more clean energy innovation. In addition to the bipartisan authorizations in the Energy Act of 2020, the most recent FY20 & 21 appropriations bills are great successes, and I applaud the critical programmatic direction and eagle-eyed

investments in enhanced geothermal, advanced nuclear, carbon capture, grid-scale storage and other clean energy technologies included.

With these efforts, Congress sent an undeniable message that lawmakers are serious about keeping the U.S. in the top tier of countries pursuing clean and reliable energy breakthroughs. While steady and sufficient funding is essential, providing important direction and reforms to the DoE to make sure that dollars are well spent is equally as vital to spurring clean energy innovation.

Investments for clean energy demonstrations for carbon capture, advanced nuclear, grid scale long-duration energy storage, enhanced geothermal, hydrogen and direct air capture are currently core features of the bipartisan infrastructure package that passed out of the Energy and Natural Resources Committee last week on July 14, 2021.

Making investments in these programs will greatly accelerate clean energy innovation in America which will turn into market opportunities with rapidly growing nations. We are very much looking forward to continuing that strong momentum.

Again, we must think globally when approaching this challenge. Partisan regulations will not pass the political sustainability test needed for climate solutions. Likewise, halting pipelines or placing moratoriums on oil and gas drilling on federal lands also has little to no impact on actual carbon dioxide emissions in the U.S., let alone the rest of the world—particularly if we are simultaneously pushing OPEC+ for expanded oil and gas production globally. And none of that will make us more competitive with China. We agree, the cost of inaction on climate is high, and finding bipartisan common ground on clean energy innovation policy is priceless.

Thank you again for the opportunity to provide remarks. ClearPath is eager to assist the Committee in developing innovative policies and understanding the emission threats from East Asia and the Pacific. We applaud the Committee for taking on this important task to help ensure America's energy innovation leadership is upheld by bringing more cutting-edge energy technologies to market in the service of a stable global climate.

Notes

[1] https://earthobservatory.nasa.gov/images/148303/as-jakarta-grows-so-do-the-water-issues

[2] https://www.iea.org/reports/coal-2020/supply

[3] https://www.iea.org/fuels-and-technologies/electricity

[4] Emissions data sourced from Rhodium Group Climate Deck. https://climatedeck.rhg.com/

[5] Energy Information Administration. International Energy Outlook, 2019 Table: World carbon dioxide emissions by region. https://www.eia.gov/outlooks/aeo/data/browser/#/?id=10-IEO2019&region=0-0&cases=Reference&start=2010&end=2050&f=A&linechart=Reference-d080819.3-10-IEO2019Reference-d080819.16-10-IEO2019&ctype=linechart&sourcekey=0

[6] https://climatedeck.rhg.com/

[7] https://www.bbc.com/news/world-asia-57018837

[8] Ibid.

[9] https://www.reuters.com/world/china/chinas-xi-says-china-will-phase-down-coal-consumption-over-2026-2030-2021-04-22/

[10] https://www.bu.edu/gdp/2021/07/07/who-funds-overseas-coal-plants-the-need-for-transparency-and-accountability/

[11] Boston University Global Development Policy Center, China Global Energy Finance (https://www.bu.edu/cgef/#/all/EnergySource)

[12] Boston University Global Development Policy Center, China's Global Power Database (https://www.bu.edu/cgp/)

[13] Chinese participation in this case takes many forms, including construction and contracting, foreign direct investment, finance, aid, or different combinations of the above.

[14] The height of each bar is based on electric production capacity, and the color indicates the resource type. Black is coal, dark blue in hydropower, and light blue is natural gas. Boston University Global Development Policy Center, China's Global Power Database (https://www.bu.edu/cgp/)

[15] https://www.reuters.com/article/us-china-coal/chinas-new-coal-power-plant-capacity-in-2020-more-than-three-times-rest-of-worlds-study-idUSKBN2A308U

[16] Global Energy Monitor, "China Dominates 2020 Coal Plant Development," Accessed July 10th, 2021 https://globalenergymonitor.org/wp-content/uploads/2021/02/China-Dominates-2020-Coal-Development.pdf

[17] https://www.reuters.com/article/us-china-energy-climatechange/china-doubles-new-renewable-capacity-in-2020-still-builds-thermal-plants-idUSKBN29Q0JT

[18] https://gwec.net/a-gust-of-growth-in-china-makes-2020-a-record-year-for-wind-energy/

[19] https://www.greentechmedia.com/articles/read/what-is-going-on-with-chinas-crazy-clean-energy-installation-figures

[20] Data is sourced from BP's statistical review of world energy (https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html), 2021.

[21] https://www.aspeninstitute.org/publications/building-cleaner-faster-report/

Senator MARKEY. Thank you, Mr. Powell. Thank you for being here.

I think that we have made our connection. Our witness is in the Philippines, so there was a little bit of a technological glitch.

But, Marinel Ubaldo, if you are there.

[No response.]

Senator MARKEY. Marinel, can you hear us?

Ms. UBALDO. Can you hear me?

Senator MARKEY. Yes, perfectly clearly. So ——

Ms. UBALDO. Okay.

Senator MARKEY. The miracle of modern telecommunications makes it possible for you to testify here before the Senate Foreign Relations Committee, as an incredible human rights and climate activist in the Philippines.

Welcome. Please introduce yourself and tell your story.

STATEMENT OF MARINEL SUMOOK UBALDO, YOUTH CLIMATE ACTIVIST, THE PHILIPPINES

Ms. UBALDO. Your honorable members of the subcommittee, fellow advocates, ladies and gentlemen, greetings from the Philippines.

I am Marinel Ubaldo, a 24-year-old young professional who is trying to live a normal life after surviving the wrath of Super Typhoon Haiyan.

I am currently working as the advocacy officer for ecological justice and youth engagement for Living Laudato Si' Philippines, an interfaith movement initiated by Catholic laypeople calling the Philippine financial institutions to divest from coal-related operations and other environmentally harmful activities and as the Philippine country coordinator for COY16 in Glasgow.

I grew up in Matarinao, Salcedo, Eastern Samar, with fond memories of a happy childhood, playing in a white sand near the shore and facing the Pacific Ocean. I grew up not worrying about food, since we are living on the coast with abundant produce.

My father is a fisherman. He did not need to sail far the catch fish. The ocean has always provided for us. Growing up near the Pacific Ocean I have been used to typhoons. It is nothing new to me. Our house has always endured every storm, and we seldom need to evacuate.

Not until Super Typhoon Haiyan happened. The night before Haiyan struck, we had no more electricity. So together with my whole family, we were already at the evacuation center which was 10 meters away from our house.

I brought an encyclopedia with me so I can just read until the storm passes. My bag was only filled with my phone, charger, notebook and pen. I did not bring any clothes with me because I thought we could go home immediately when the storm subsides.

It has always been that way. Never did it cross my mind that we will have nothing left of our house but only one-fourth of its flooring and about three of its columns. We did not really know what storm surge meant until we experienced that ourselves.

Around 3:00 o'clock in the morning on November 8th, 2013, everyone was panicking as the winds became more intense. We wanted to evacuate again because there might be a tsunami.

I saw a woman carrying her child who almost had her head cut off because of the GI sheets blowing around by the strong winds. I could not fully describe what was happening at that moment.

There were plenty of families with their children in tow, rushing to seek refuge in our evacuation center because the evacuation center they were in got destroyed. The roof, the windows, and the doors of the building we were in got also destroyed. Many of us got injured because of the broken glass windows and falling debris, and 11 people died in our village.

Three days after Haiyan, we were left in isolation. We had nothing to eat but cassava. We had no food, no water, no electricity, and no secured shelter. We had no change of clothes so we were all wet and cold. I was so confused and devastated by the reality I was facing.

I was only 16 years old and was about to graduate high school at that time, and I was not even sure if I could graduate, let alone continue my college education. I lost my books and my uniform.

How can I continue studying when my parents cannot afford to send me to school anymore because we lost our livelihood? For three months, I was not able to go to school because it got destroyed.

March 2014 came and we needed to fast track all the lessons if we could graduate by April 2014. After Haiyan happened, it seemed like my future even became more uncertain because my parents did not earn enough to send me to college.

Luckily, I was able to get a scholarship for my college education and was able to work by facilitating training on climate change adaptation and mitigation.

I had no choice but to do it so I could sustain my especially because our fishing livelihood stopped for months because my father's boat was broken and there were no fish to catch.

We could not also bear the thought of eating fish that may have fed on dead bodies of our neighbors and the people we knew. My father had to sail to other places just to go fishing, but he would end up with little to nothing.

There was a huge depletion of fish catch after Haiyan and it made surviving even more difficult. It even came to a point that when my mom could not handle it anymore, so she left us for good. We were faced with another dilemma.

I was already in my first year of college in Tacloban at that time when my father told me the news. As time passed, my father suffered from depression. He barely ate and slept. He could not bear to go fishing anymore and he became suicidal. Being far away from home knowing that your family is in that painful situation made things worse, but I had to remain strong.

I first learned about climate change and disaster risk reduction in October 2012. At the age of 15 years old, I became a child facilitator and I had the opportunity to visit remote communities and schools to educate people about the causes and effects of climate change and the measures necessary to adapt and mitigate its effects.

Seven years later, my nerves still get the best of me whenever I hear the crash of the ocean waves. I get anxious and restless when it rains because I fear that another Haiyan would happen

again. It took me three years before I was able to go into the ocean again.

It is sad because the water was our childhood friend. I grew up with it. It is always providing everything we need. But now, whenever we look at the ocean, there is always fear because we can never forget how it took everything away from us.

Super Typhoon Haiyan was the strongest typhoon ever recorded. If climate change continues, the Philippines will be experiencing more and stronger typhoons. Super typhoons will become a normal phenomenon and it would mean that my children will live their lives fighting and surviving super typhoons.

These experiences motivated me to do more. Sharing has been the key to healing for me because I realize climate change is not just an issue of adaptation and mitigation, but also an issue of human rights.

This is the start when I started lobbying with the government, delivering talks around the U.S., Europe, and Asia.

In 2015, we submitted, along with other grassroots organizations like the fishermen, farmers, indigenous peoples, and others, a landmark petition to the Commission on Human Rights in the Philippines to investigate 47 carbon majors for their contributions to human rights violations linked to climate impact.

And in 2018, I have served as a community witness during the public hearing in New York, and in September, I was one of those who did a lone protest in front of the Shell Company in Manila, calling them to face the people.

Finally, after four years of ——

Senator MARKEY. Ms. Ubaldo, please summarize the remainder of your testimony.

Ms. UBALDO. Okay. So to the people here today, I mean, you are leaders. You are known experts in your respective fields. You are being looked up to by so many people.

But behind those achievements, you are fathers, mothers, grandfathers, mothers, aunts or uncles, sisters and brothers. When you go home, you go home to the kisses of your children, and there you have to look them in the eye and tell them you are burning their future in front of your own eyes.

You should be the one asking me what the U.S. could do to help us. You should know the answer to that. Stop funding business as usual. Stop loaning developing countries large amounts of money for climate projects that are impossible to be settled.

You need to take accountability for the suffering of vulnerable people from countries that are not contributing that much to global carbon emission like the Philippines. Stop the fake it until you make it tactic.

We are in an emergency, not in a show. You are super heroes to your children and you should be one for the Earth. I saw the hopelessness the typhoon had caused and the struggle of my community and my family, the loss and destruction. I have seen the depth.

I realize we should not just accept being vulnerable throughout our lives. We should not accept being only victims. We have the power and we have to do something, and I do not want my family and community to suffer again this way.

No amount of climate denial or apathy can resurrect our loved ones. But I hope to waken the minds of those most responsible for climate change, of those who have the greatest capacity to act and change the current system for the protection of vulnerable communities everywhere.

[The prepared statement of Ms. Ubaldo follows:]

Prepared Statement of Marinel Ubaldo

I'm Marinel Ubaldo, a 24-year-old young professional who is trying to live a normal life after surviving from the wrath of super typhoon Haiyan. I'm currently working as the Advocacy Officer for Ecological Justice and Youth Engagement for Living Laudato Si' Philippines, an interfaith movement initiated by Catholic lay people calling on Philippine financial institutions to divest from coal-related operations and other environmentally harmful activities, and as the Philippine Country Coordinator for COY16 in Glasgow. I grew up in Matarinao, Salcedo, Eastern Samar, with fond memories of a happy childhood playing on a white sand near the shore on a coast facing the Pacific Ocean. I grew up not worrying about food, since we are living on the coast with abundant produce. My father is a fisherman. He did not need to sail far to catch fish. The ocean has always provided for us.

Growing up near the Pacific Ocean, I have been used to typhoons—it's nothing new to me. Our house has always endured every storm and we seldom need to evacuate. Not until super typhoon Haiyan happened.

The night before Haiyan struck, we had no more electricity. Together with my whole family, we were already at the evacuation center which was 10 metres away from our house. I brought an encyclopedia with me so I can just read until the storm passes. My bag was only filled with my phone, charger, notebook and pen. I didn't bring any clothes because I thought we could go home immediately when the storm subsided. It has always been that way. Never did it cross my mind that we will have nothing left of our house, but only ¼ of its flooring and about three of its columns. We did not really know what storm surge meant until we experienced it ourselves.

Around 3 o'clock in the morning on November 8, 2013, everyone was panicking as the winds became more intense. We wanted to evacuate again because there might be a tsunami. I saw a woman carrying her child who almost had her head cut-off because of the GI sheets blown away by the strong winds. I couldn't fully describe what was happening at that moment. There were plenty of families with their children in tow, rushing to seek refuge in our evacuation center because the evacuation center they were in got destroyed. The roof, windows, and doors of the building we were in also got destroyed. Many of us got injured because of the broken glass windows and flying debris, and 11 people died in our village.

I went back to our house even though the winds were still strong, as I wanted to see if we still had a home to go back to. Although it was still dangerous for me to go back, I wanted to save the box that has a sentimental value to me. This box was very special to me because it was filled with my personal things—my literary works, the certificates and medals I earned in school. For me, that box symbolizes who I am, my achievements, my self-worth. Nothing was left of our home. And losing that box felt like losing my identity, my dreams, my significance as a person.

Three days after Haiyan, we were left in isolation. We had nothing to eat but cassava. We had no food, water, electricity, and secured shelter. We had no change of clothes so we were all wet and cold. I was confused and devastated by the reality I was facing. I was only 16 and was about to graduate high school at that time, and I wasn't even sure if I could graduate, let alone continue my college education. I lost my books, my uniform. How can I continue studying when my parents cannot afford to send me to school anymore because we lost our livelihood?

For 3 months I was not able to go to school because it got destroyed. March 2014 came and we needed to fast track all lessons so we could graduate by April 2014. After Haiyan happened, it seemed like my future even became more uncertain because my parents did not earn enough to send me to college. Luckily, I was able to get a scholarship for my college education, and was able to work by facilitating training on climate change adaptation and mitigation.

I had no choice but to do it so I could sustain my needs, especially because our fishing livelihood stopped for months because my father's boat was broken, and there were no fish to catch. We couldn't bear the thought of eating fish that may have fed on the dead bodies of our neighbors, and people we know. My father had to sail to other places just to go fishing but he would end up with little to nothing.

There was a huge depletion of fish catch after Haiyan and it made surviving even more difficult.

It even came to a point when my mom couldn't handle it anymore, so she left us for good.

And thus we were faced with another dilemma. I was already in my first year of college in Tacloban at that time when my father told me the news. As time passed, my father suffered from depression, he barely ate and slept. He couldn't bear to go fishing anymore, and he became suicidal. Being far away from home knowing that your family is in that painful situation made things worse, but I had to remain strong.

I first learned about Climate Change and Disaster Risk Reduction in October 2012. At the age of 15, I became a child facilitator and I had the opportunity to visit remote communities and schools to educate people about the causes and effects of Climate Change, and the measures necessary to adapt and mitigate its effects.

Seven years later, my nerves still get the best of me whenever I hear the crash of the ocean waves. I get anxious and restless when it rains because I fear that another Haiyan will happen again. It took me 3 years before I was able to go into the ocean again. It's sad because the ocean was our childhood friend, I grew up with it. It has always provided everything we need. But now, whenever we look at the ocean, there's always fear because we can never forget how it took everything away from us.

Super Typhoon Haiyan was the strongest typhoon ever recorded. If climate change continues, the Philippines will be experiencing more and stronger typhoons. Super Typhoons will become a normal phenomenon, and it would mean that my children will live their lives fighting, and surviving super typhoons.

These experiences motivated me to do more. Sharing has been the key to healing for me. Because I realized Climate Change is not just an issue of adaptation and mitigation but also an issue of human rights. This is the start when I started lobbying with the government, delivering talks around the U.S., Europe, and Asia.

Last 2015, we submitted, along with other grassroots organizations like the fisherman, farmers, IPs and others, a landmark petition to the Commission of Human Rights of the Philippines to investigate 47 carbon majors for their contributions to human rights violations linked to climate impact. And, in 2018 I have served as a community witness during the public hearing in New York, and September last year I was one of those who did a lone protest in front of the Shell Company in Bonifacio Global City calling them to face the people. Finally, after 4 years of battling with the carbon majors, we have won and the result of the first in the world Climate Justice petition is a basis for future actions. Now, there is already a legal document that declares that these highest carbon emitting companies are responsible for fueling climate change, and for the human rights violations linked to climate impacts. We are nearing the justice that we deserve. We want the carbon majors to acknowledge their responsibility for what they have done to us, to my community and other vulnerable communities around the world. But these companies didn't show up in any of the hearings conducted. They did not have the decency to hear the stories of people who have suffered because of their business practices.

My international engagements gave me an opportunity to be exposed to different environments allowing me to experience working and networking with people from diverse backgrounds, and understanding different ways and approaches that organizations do to help young people become a catalyst of change in their communities. My global campaign with Amnesty International on Write for Rights gathered almost 600,000 support worldwide, through organizations like Plan International, Greenpeace, Amnesty, and Living Laudato Si' Philippines. I was able to represent the voices of the youth and the marginalized at COPs and COYs. And, for this year, I am set to attend the Pre-COP YouthInClimate Driving Action in Milan Italy, and the COY16 in Glasgow.

Also, together with my three friends, we have founded the Youth Leaders Environmental Action Federation that is a youth-led organization based in Eastern Visayas. The organization partners with different youth organizations in communities and schools. We give mentorship and training to other youth organizations on where and how to start with their advocacy, projects and programs. We are the first organization who organized the Climate Youth Strike in Eastern Visayas. We also have submitted a petition to the City of Tacloban to ban single use plastics, and we have lobbied with the city council with a policy on the banning of single-use plastic. Those are just some of the things that we have achieved so far, and we are continuing.

Our government in the Philippines has long been deaf to the outcry of their people. In COP25 in Madrid, no one from our government has brought the voices of the Filipino people to the negotiation table. In 2019, the Philippines is the third

most deadliest country to be an environmental advocate, according to Global Witness.

Friends from the U.S. who are here today, you are leaders, you are known experts in your respective fields, you are being looked up to by so many people, but behind those achievements, you are fathers, mothers, grandfather/mothers, aunts/uncles, sisters/brothers to the younger generation. When you go home, you go home to the kisses of your children. I dare you to look them in the eye, and tell them you are burning their future in front of your own eyes. You should not be the one asking me what the U.S. could do to help us. You should know the answer to that. Stop funding business as usual. Stop loaning developing countries large amounts of money for "climate projects" that are impossible to be settled. You need to take accountability for the suffering of vulnerable people from countries that are not contributing that much to global carbon emission like the Philippines. Stop the "fake it until you make it" tactic, we are in an emergency not in a show. You are superheroes to your children, and you should be one for the Earth.

I saw the hopelessness the typhoon had caused—the struggle of my community and my family, the loss and destruction. I have seen death. I realized we should not just accept being vulnerable throughout our lives; we should not accept being only victims. We have the power and we have to do something. I do not want my family and community to suffer again.

More and more young people are fighting to reclaim our rights to our future. There should be no such thing as a youth climate activist, yet here I am and there are thousands of others like me who have led a life of activism not by choice but by necessity.

No amount of climate denial, or apathy can resurrect our loved ones. But I hope to awaken the minds of those most responsible for climate change, of those who have the greatest capacity to act and change the current system for the protection of vulnerable communities everywhere.

I'm here in front of you, not just as a climate statistic you see in the news, but I'm here as a human being—hoping to remind you that we need to value lives again.

In his encyclical, Laudato Si—the Care on Our Common Home—paragraph 49, Pope Francis said, "We have to realize that a true ecological approach always becomes a social approach; it must integrate questions of justice in debates on the environment, so as to hear both the cry of the earth and the cry of the poor."

My story is only one of many, and I'm here to speak on behalf of the vulnerable and the marginalized communities—may our voices be heard. Thank you!

Senator MARKEY. Ms. Ubaldo, we thank you for your opening statement, and during the question and answer period you are going to be given plenty of opportunities to be able to expand upon your thoughts. We thank you and we thank you for that powerful, opening.

I would now like to recognize our final opening witness, who is an old friend, Sherri Goodman. Sherri is the Secretary General for the International Military Council on Climate and Security.

Back in 2007, when I was the chair of the Select Committee on Climate Change in the House of Representatives, in my first hearing I called Sherri so that she could select my first witness, and what she surveyed the 12 three- and four-star generals and admirals who she had organized and were speaking out powerfully against climate change as a security threat.

General Gordon Sullivan, who had been the Army Joint Chiefs of Staff lead, was our first witness, next to James Woolsey, who was George Bush's head of the CIA, next to Richard Haass, who is the head of the Foreign Relations Council.

We just decided to lay out the security and foreign policy implications of climate change. That was 14 years ago, and Sherri Goodman continues to lead on these issues. We welcome you, Sherri, whenever our technological wizards can connect us, and we look forward to your testimony, my friend.

Ms. GOODMAN. Thank you, Mr. Chairman. Can you see and hear me?

Senator MARKEY. We can hear you and it is good to see you, Sherri.

Ms. GOODMAN. Okay. Great.

Senator MARKEY. Whenever you are comfortable, please begin.

STATEMENT OF SHERRI GOODMAN, SECRETARY GENERAL, INTERNATIONAL MILITARY COUNCIL ON CLIMATE AND SECURITY, WASHINGTON, DC

Ms. GOODMAN. Thank you, Mr. Chairman, and thank you for accommodating me virtually. I am in a very important state, which you know very well, as does your ranking member, and I plan to see General Sullivan here next week.

We bring you greetings, and it is a privilege to appear before you today.

The bottom line up front, as we say, I am going to address four things: how is climate change a threat multiplier in the region; second, what impacts will it have on regional stability; third, what does it—what do these changes mean for the U.S. military and its operations in the region; and fourth, what should we do about it.

Okay. As you have just said, since the CNA Military Advisory Board first characterized climate change as a threat multiplier in 2007, national security leaders and a bipartisan Congress have concluded that climate change can exacerbate political instability where food, water, and resource shortages already exist, often in the world's most dangerous and fragile regions, as we just heard so compellingly from Marinel, and thank you for sharing your personal story.

Climate change now contributes to unprecedented security threats for the United States here at home, as we heard today. The Director of National Intelligence has repeatedly emphasized that the United States will have to manage the negative effects of a changing climate.

President Biden has not only recognized these threats, but elevated them by putting climate security front and center in his foreign policy, calling for the integration of climate considerations across the work of all agencies.

Second, the specific climate security risks facing East Asia and the Pacific, the regions highly exposed to climate-driven hazards including extreme hydro meteorological and heat events, sea level rise, acidifying oceans, across the region these climate impacts are exacerbating physical, ecological, socioeconomic stressors, leading to intensified food and other resource competition, societal tension, migration, and displacement.

Southeast Asia exemplifies these dynamics, as we reported this earlier this year. In the South China Sea, countries face contested maritime boundaries and competition for ocean-based resources.

On land, excessive heat and drought, particularly in rural agricultural areas, are accelerating migration to coastal cities, which are themselves at risk from storms and inundation.

Domestic insurgent groups are able to recruit desperate farmers and fishermen, who are no longer earning a living due to climate change-related effects. These threat amplifiers, added to the physical damage wrought by climate impacts, are stunting economic

growth, ecosystem sustainability, and impairing the ability of governments to provide even basic services.

What does this mean for U.S. military operations in the region? Climate change simultaneously reduces the military's operational preparedness and expands its missions by straining the base infrastructure, interrupting exercises and increasing the need for humanitarian assistance and disaster relief.

Secretary of Defense Austin underscored this point at the World Leaders Climate Summit in April, noting that the February 2019 typhoon outside of the typical typhoon season forced the United States to pause exercises with its Australian and Japanese allies.

What should we do? The United States should leverage all the tools in its toolbox across agencies and governments to address security-related climate threats. Such an approach has the added benefit of enhancing geostrategic and economic competitiveness with China.

The U.S. Climate Security Strategy should not be separate from but, instead, integrated with our strategy to compete and align or cooperate with China as needed in America's national interest.

Three types of recommendations are key.

First, increasing U.S. investment in science research, development, and deployment and the innovation culture of the private sector. This investment across many U.S. agencies, will not only advance clean energy transition but advanced climate predictive technologies, so essential to managing for resilience in a warming world.

Additionally, these investments are a source of American national power that enable the United States to compete with China and demonstrate leadership to our strategic advantage in the region.

Second, we need to help our allies and partners tackle climate security risks. Marinel discussed them extensively. Using a whole-of-government approach, the U.S. is now developing unified interagency regional climate security strategies.

As part of this effort, State, Defense, USAID, and others need to work together utilizing this new climate risk assessment framework to incorporate climate security considerations into all foreign and defense policy planning, and I think U.S. INDOPACOM is at the front of this effort.

Finally, we need to improve the resilience of U.S. and allied force posture and base infrastructure in the Pacific. Many of our key sovereign partners and critical force structure in the Pacific highly vulnerable to climate risks, like the Marshall Islands, Kiribat, and others.

Fortunately, DOD's Defense Climate Assessment Tool is now beginning to assess these risks. U.S. bases on small islands like Diego Garcia, Guam, Marshall Islands, need to get the access to this tool quickly.

In conclusion, though climate security risks are unprecedented, our foresight into these risks is unprecedented as well. Climate proofing our collective security is essential to protect America's 21st century near and long-term national security interests.

Thank you for the opportunity to testify today, Mr. Chairman. I look forward to your questions.

[The prepared statement of Ms. Goodman follows:]

Prepared Statement of the Honorable Sherri Goodman

Chairman Markey, Senator Romney, and distinguished Members of the Subcommittee: Thank you for the opportunity to testify before you today. I bring over 30 years of experience as a national security professional to this issue and served as the first Deputy Undersecretary of Defense (Environmental Security). I am currently the Secretary General of the International Military Council on Climate and Security, Founding Board Chair of the Council on Strategic Risks (CSR), and as Senior Strategist at the Center for Climate and Security, an institute of the CSR. I am also the Founder and former Executive Director of CNA's Military Advisory Board, and a Senior Fellow at the Woodrow Wilson International Center. The views I am presenting today are my own.

Let me start with a short history of how I came to determine that climate change is a security threat, and why it is in America's interest to understand the magnitude of this issue and the urgent need to address it.

When I served as the Deputy Undersecretary of Defense for Environmental Security in the 1990s, we were primarily focused on cleaning up hazardous waste from Cold War-era military activities. Over time, environmental issues evolved and became part of our National Security Strategy, when we began to consider the fact that conflicts over access to, or control of, natural resources compromised U.S. national security interests. The focus then was on regional cooperation between countries to reduce nuclear risks, including from nuclear waste, preventing transnational environmental crime such as illegal fishing and logging, promoting cooperation among various stakeholders both within and outside of government, and better understanding and addressing the consequences of environmental threats. The Department of Defense (DoD) began integrating environmental concepts into planning under its Preventive Defense Strategy, and in 1993 it took on the role of " . . . [helping] deter or mitigate the impacts of adverse environmental actions leading to international instability."[1] The U.S. Pacific Command was one of the first Combatant Commands to hold an Environmental Security Partners Engagement conference with ministers from across the Pacific and still conducts the Pacific Environmental Security Forum with our key allies and partners.

These developments at DoD, along with the implications of climate change coming into sharper focus, led to a marked increase in concerns about the security risks of climate change from both the Department of Defense and the Intelligence Community[2] during the George W. Bush administration. While at CNA during that time, I founded the CNA Military Advisory Board (MAB), composed of senior retired generals and admirals, to assess the national security implications of climate change. In a seminal report in 2007 we identified climate change as a "threat multiplier," amplifying existing conditions of instability. The CNA MAB in this Report stated, "[t]he potential consequences of climate change are so significant that the prudent course of action is to begin now to assess how these changes may potentially affect our national security, and what courses of action our nation should take."[3] We recommended that the national security implications of climate change be incorporated into the broad range of national security strategy and planning documents.

Building from work of the CNA MAB, the Center for Climate and Security (CCS), where I am now a Senior Strategist, assembled an Advisory Board of 30 senior retired military leaders and national security professionals, who have served across both Democratic and Republican administrations, and in all branches of the U.S. military and the U.S. Coast Guard. Since 2011, CCS has produced a steady stream of reports and articles on the national security risks of climate change, and was the first organization to highlight the climate change dimension in Syria's political instability.[4] CCS also hosts a climate and security "community of practice," the Climate and Security Advisory Group (CSAG), that includes participation from over 300 national security, military and intelligence leaders. In 2019, the CSAG released a Climate Security Plan for America, which laid out a roadmap for the Federal Government to tackle the security risks posed by climate change. In 2020, CCS assembled a National Security, Military and Intelligence Panel (NSMIP) to produce a first-of-its-kind Security Threat Assessment of Global Climate Change.

With its partners in Europe, the CCS has established an International Military Council on Climate and Security, including representatives from 38 countries, to meet the growing concerns about climate change from our allied and partner nations' militaries. In addition to an annual World Climate and Security Report, the IMCCS Expert Group has produced a range of reports assessing climate security

risks, including analyses of many countries in East Asia and the Indo-Pacific, which will form the basis of my remarks today.

Since the CNA MAB first characterized climate change as a "threat multiplier" in 2007, the national security community has concluded that climate change now contributes to unprecedented security threats for the United States—and the world. Growing evidence demonstrates that climate change is increasing the likelihood of conflict in key regions.[5] In 2016, the Climate Security Consensus Project stated that "the effects of climate change present a strategically-significant risk to U.S. national security." In the Fiscal Year 2018 National Defense Authorization Act (NDAA), Congress determined that "climate change presents a direct threat to the national security of the United States and is impacting stability in areas of the world both where United States Armed Forces are operating today, and where strategic implications for future conflict exists." In 2018, research supported by USAID, further demonstrated the effects of climate change on state fragility around the world. The Director of National Intelligence, via the Worldwide Threat Assessment, has repeatedly emphasized that the United States will have to manage the negative effects of a changing climate and the National Intelligence Council (NIC) has publicly released papers on topics such as water security, food security, and overall climate change developments that have noted the national security implications. The most recent Global Trends Report from the NIC, published earlier in 2021, characterized climate and environmental issues as one of four fundamental trends that will shape national security going forward.

The Biden administration has not only recognized these threats, but has elevated them by putting climate security front and center in its foreign policy, calling for the integration of climate considerations across the work of all agencies.

This whole-of-government approach is critical, as these unprecedented climatic changes arrive during a time of other rapid and unprecedented changes in the geostrategic environment. Population growth, rising powers, an increase in the political fortunes of authoritarians, weakening norms against the use of weapons of mass destruction, and rapid and disruptive technological changes, among other major risks, are combining to challenge us in dizzying ways. The impacts of rapid climate change, including an array of extreme weather events, arrive in this already unstable and volatile world, threatening to further destabilize the international order. While there is no region of the world that will be left untouched by these changes, I am pleased today to provide a more detailed assessment of the risks posed in East Asia and the Pacific.

CLIMATE SECURITY IN EAST ASIA AND THE PACIFIC: OVERVIEW

East Asia and the Pacific are highly exposed to climate change-driven hazards, including extreme hydrometeorological and heat events, sea level rise and acidifying oceans. These unprecedented hazards arrive in a region that already faces a broad spectrum of conventional, unconventional, and hybrid security risks and challenges.

Upon the release of two new reports focused on South Asia and Southeast Asia, from CCS earlier this year former U.S. Pacific Commander Admiral Samuel J. Locklear III, U.S. Navy (Ret.), stated: "We have entered an age in which multiple, converging risks define our security environment. In the Indo-Pacific region, climate change is the biggest long-term security threat." Climate impacts are getting more potent, dialing up the threats from existing conflict patterns and resource scarcities. At the same time, climate projections are getting more precise. This combination of potency and precision translates into an obligation for militaries to anticipate, train, equip and prepare for increasingly dangerous climate security scenarios."

These developments affect the U.S. military mission in the region and increase risks of regional instability. However, they also present opportunities for closer collaboration with U.S. allies and partners in the region. Let me discuss each of these areas in turn.

Impacts on the U.S. Military Mission

In this region, climate change simultaneously impedes the U.S. military's operational preparedness and expands its missions by straining physical infrastructure, interrupting exercises, and increasing the need for humanitarian and disaster relief missions. As Erin Sikorsky and Caroline Baxter noted in Just Security earlier this year:

> "Worsening storms and overlapping typhoon seasons in Japan and South Korea threaten the structural integrity of U.S. bases in-country and inhibit reception, staging, and onward movement of forces flowing from the United States to the theater of operations. Rising sea levels threaten airfields on small islands like Guam, Palau, and Yap and diminish their utility as locations for prepositioned

U.S. equipment. Without these locations, every military challenge in the region becomes significantly harder."

Secretary of Defense Austin underscored this point at the World Leaders Climate Summit in April 2021, noting that the February 2019 Typhoon Wutip—outside of the typical typhoon season—forced the United States to pause exercises with its Australian and Japanese allies.

In terms of humanitarian aid and disaster relief missions, in 2020 the International Federation of the Red Cross reported 25 climate-related disasters in the region—a record high. In testimony before Congress in 2019, Admiral Phil Davidison, Commander of U.S. Indo-Pacific Command, explained that these types of response missions are the most immediate and concrete way in which climate change is affecting operational readiness.

Climate Change and Regional Instability

In addition to direct risks to the U.S. military mission, climate change is increasing financial and political burdens on already-strained governments, heightening tensions and opening new areas of competition in East Asia and the Pacific, particularly vis-à-vis China.

Across the region, climate impacts are inducing or exacerbating physical, ecological, and socio-economic stressors, leading to intensifying food and other resource competition, societal tensions, and irregular migration and displacement—which, in turn, can amplify existing security challenges or create new ones. Internal and cross-border climate-related migration can stress densely-packed urban areas, particularly in areas experiencing economic or political instability, or both. Such migration also can increase inter-communal conflicts and grievances with governments.

Southeast Asia exemplifies these dynamics, as the Expert Group of the International Military Council on Climate and Security (IMCCS) detailed in a report released in February of this year. In regional waters, like the South China Sea, countries face contested maritime boundaries and competition for ocean-based resources. On land, excessive heat and drought, particularly in rural agricultural areas, can induce migration to coastal cities, which are themselves at risk from storms and inundation. Domestic insurgent groups and violent extremist organizations are recruiting farmers and fishermen, who are desperate, because they are no longer earning a livelihood. Fishermen adept at making bombs for "blast fishing"—the practice of stunning fish with an underwater explosion, then capturing them with a net—are particularly attractive recruits. These "threat amplifiers," added to the physical damage wrought by climate impacts, are stunting economic growth, ecosystem sustainability, and impairing the ability of governments to provide basic services, compromising stability and security.

Southeast Asia is home to about 9 percent of the global population, but 18 percent of the global fish catch. Overfishing and warmer, more acidic oceans are taking a toll on both historically rich fishing grounds and traditional livelihoods supporting millions. Small local fishing boats forced to sail farther from land are confronted with armed Chinese vessels. In September 2020, the Chinese Coast Guard reported that over the course of the preceding 4 months it had evicted over 1,100 fishing boats from the northern half of the South China Sea, while detaining 11 vessels and over 60 foreign crew members. Similar aggressive tactics from Chinese long-range fishing fleets, including involvement in illegal, unreported and unregulated (IUU) fishing in the Exclusive Economic Zones of Pacific Island States, appear to be occurring throughout the broader Indo-Pacific region and beyond.[6] According to a 2017 analysis from Australian climate security researcher Dr. Michael Thomas, increasing competition for declining stocks "could further strain the international rules-based approach to fishing governance and could well increase tensions, violent confrontations and military brinkmanship over the multiple overlapping and competing territorial claims in the South China Sea."

Climate factors are also consequential in the tense relations between nuclear-armed India, Pakistan and China. A joint study published earlier this year by the Council on Strategic Risks and the Woodwell Climate Research Center projects a strong warming trend near the disputed border between India and China, where approximately 100,000 Indian and Chinese troops are deployed at altitudes reaching 15,000 feet. Military patrols, which are not viable today, may become more frequent, setting the conditions for potential violent clashes.

Meanwhile China—partly due to its transition to renewable energy—is planning the world's largest hydroelectric facility just north of where the Brahmaputra River crosses into India. Three times the size of Three Gorges Dam, this newer dam project is also located in a seismically sensitive zone. This has caused major concerns for downstream India, which is also worried that the new Chinese dam could be used to either withhold water from or flood parts of India. In truth, it will be

difficult to tell if a future flood is the result of Chinese manipulation of the dam, or climate-related factors. China's lack of transparency on dam projects affecting its neighbors only increases India's distrust.

China is also constructing a series of dams in Pakistani-held Kashmir, to which India objects, due to its territorial claims there. These dams, when built, will be viable until the end of the century, due to projected glacial melt patterns. Such construction will contribute to further strengthening the China-Pakistan partnership while exacerbating both countries' tensions with India. In each of these disputes, universally trusted data sources, and institutions capable of managing resource-related disputes, are lacking.

Opportunities to Support Allies and Partners in the Region

In this context, the United States will need to develop and implement more expansive approaches to maintaining and enhancing its regional influence, and supporting the interests of its allies, and current and prospective partners in the Indo-Pacific, including robustly supporting climate resilience efforts in the region. Interestingly, in a survey of ASEAN member states' top challenges in 2021, the threat of climate change outranked the threat of regional military tensions by nearly 10 points. For the Philippines, a crucial U.S. ally in the region, the gap was almost 20 points.

As I wrote with a colleague in The National Interest earlier this year, "In some cases, the United States will need to compete for influence where China is taking advantage of climate change to improve its military posture in the South China Sea or become the relief provider of first resort to vulnerable Pacific Island nations."

In addition to integrating climate into our assessments of security threats, the United States can further "climatize" security by bringing climate and ecological considerations into both the State Department and Defense Department's foreign security assistance programs. Addressing the geopolitical dynamics of the risks of climate change and other ecological disruption requires the United States to step up and play a leadership role in helping allies and partners build resilience to climate change effects and associated security risks.[7]

As the U.S. Department of Defense (DoD) carries out its global posture review with the goal of aligning force posture with security strategy, DoD should consider how it can better enhance the resilience of allies and partners and work with them to help them build their capacity to endure future climate security and ecological security risks.

RECOMMENDATIONS

As the CCS outlined in its Climate Security Plan for America (CSPA), the United States should use all of the tools in its toolbox across agencies and the government to address security-related climate threats and enhance geostrategic and economic competitiveness with China by: 1) investing in scientific research and development on climate and clean energy; 2) helping allies and partners tackle climate security risks; and 3) improving the resilience of U.S. and allied force posture and base infrastructure in the Pacific.

Investing in Science, Research and Development

Increased U.S. investment in science, research and development on climate and clean energy will not only advance the state of energy technology, but it will offer another way for the United States to demonstrate global leadership on climate issues and compete with China. To avoid catastrophic security risks in the second half of the century, the world needs to rapidly advance the state of the art in low and zero/net-zero-emissions technology, particularly in lowering the cost of developing and fielding such technologies at the scale required to sustain stable global economic development. Such an effort should include accelerating the research, development, techniques, and technologies in diverse fields from energy production and storage to agriculture, forestry, and beyond needed to ensure that net global emissions are reduced.

Helping Allies and Partners

To ensure a whole-of-government approach to supporting allies and partners climate security efforts, the CSPA argues for the adoption of regional climate security strategies, or "unified interagency plans that support U.S. national security, foreign policy and development strategies in critical regions of the world to bolster climate resilience and clean energy transitions in key countries, prevent climate stress from destabilizing fragile states, expand U.S. alliances and partnerships, and compete with great powers."

As part of this effort, the Defense Department should develop a "Security Forces Climate Engagement Plan" to promote regular military-to-military and civil-military international engagement on climate change preparation, to enhance the resilience of U.S. allies and partners, and to enhance U.S. influence vis-à-vis its primary competitors. Also, the Defense Department and State Department should work together to evaluate whether Security Assistance and Foreign Military Sales programs are effective in assisting allies and partners in addressing the security impacts of climate change. Congress and the Department of Defense should also revitalize the Defense Environmental International Cooperation Program (DEIC) with sufficient resources to make military-to-military environmental cooperation a robust engagement tool for each geographic combatant command. Other avenues for deepening cooperation include sharing a modified version of the DoD Climate Assessment Tool with allies and partners for their use, as well as a version of the forthcoming risk assessment report DoD was tasked with completing as part of the Biden administration's Executive Order on tackling the climate crisis.

Improving Resilience

Key military bases in the Pacific and those of our allies and partners need to become more resilient to rising sea levels and extreme weather events, and our forces need to be prepared to operate in the increasing extreme heat conditions worldwide. U.S. naval bases on small islands like Diego Garcia, Guam, and the Marshall Islands are particularly at risk, facing serious impacts of rising seas. In the face of extreme cyclones, other bases will be strained by response demands while potentially trying to recover their own capabilities. Climate resilience for defense forces and bases should be a standing component of the ASEAN Defense Ministerials and Quad meetings and be addressed in Track II-focused fora such as the Munich Security Conference, Halifax International Security Forum, the Pacific Environmental Security Forum, and the International Military Council on Climate and Security.

CONCLUSION

The U.S. must present a compelling alternative to China's Belt and Road Initiative to our Asian and Pacific allies and partners in order to regain strategic advantage in the region. The U.S. can do so by a combination of the three recommendations above: investing in science and research, which harnesses the power of America's innovation culture, our universities, and government labs; helping our allies and partners prepare for climate security risks; and improving the resilience of our force structure and base posture in the region.

Fortunately, the difference between today and major global disruptions of the past is that we can spot impending disasters earlier and more easily. We do not have to wait for the next pandemic, the next 9/11 or the next Pearl Harbor, to better prepare for the climate crisis we are already experiencing. Though the risks are unprecedented, our foresight is unprecedented as well. Technological developments have given us predictive tools that enhance our ability to anticipate and mitigate threats, to transform energy systems for improved mission performance, and to make the security and supporting civilian infrastructure of the U.S. and of our allies and partners more resilient and secure. Congress has strengthened, and must continue to strengthen, the authorities, programs, and funding available to the State and Defense Departments, USAID, and other agencies to address these threats to both the U.S. and to our allies and partner nations in East Asia and the Pacific and globally. In short, we have the ability to make the United States and our allies and partners more resilient to a broad range of threats. "Climate-proofing" our collective security is essential to protect America's 21st-century near- and long-term national security interests. Failing to address climate security risks now will both embolden our adversaries to take the lead and will undercut our national and collective security.

Notes

[1] Sherri Wasserman Goodman, Deputy Under Secretary of Defense, (Environmental Security), Statement Before the Subcommittee on Installation and Facilities, House Armed Services Committee, May 13, 1993.

[2] The Center for Climate and Security Resource Hub, accessed at: https://climateandsecurity.org/resources/u-s-government.

[3] CNA Military Advisory Board. "National Security and the Threat of Climate Change." Report. 2007.

[4] "Military Expert Panel Report: Sea Level Rise and the U.S. Military's Mission." Eds 1 & 2. The Center for Climate and Security. September 2016 & February 2018.

[5] Schleussner, Carl-Friedrich, Jonathan F. Donges, Reik V. Donner, and Hans Joachim Schellnhuber. "Armed-conflict Risks Enhanced by Climate-related Disasters in Ethnically Fractionalized Countries." PNAS. August 16, 2016.

[6] The security implications of illegal, unreported, and unregulated (IUU) fishing in Southeast Asia, the broader Indo-Pacific region, and globally are addressed in detail in a 2016 report from the National Intelligence Council, "Global Implications of Illegal, Unreported, and Unregulated (IUU) Fishing." See also, "Fisheries, Food Security and the Issues of Climate Change and its effect on the Indo-Pacific;" "Fisheries Partnerships;" "The national security imperative to tackle illegal, unreported, and unregulated fishing."

[7] For more information on ecological security risks, please see: R. Schoonover, C. Cavallo, and I. Caltabiano. "The Security Threat That Binds Us: The Unraveling of Ecological and Natural Security and What the United States Can Do About It." Edited by F. Femia and A. Rezzonico. The Converging Risks Lab, an institute of The Council on Strategic Risks. Washington, DC. February 2021.

Senator ROMNEY [presiding]. Thank you, Ms. Goodman. Appreciate your perspective. Thank you to the panelists today.

I have explained before and you probably heard it already that we have voting going on, on the floor of the Senate.

So members of this committee keep disappearing for long periods of time. It is getting over to the Capitol, getting our votes recorded, and then getting back.

So this is no display of disrespect or lack of interest. It is, instead, just the reality of votes that we had not anticipated coming at this particular time.

Mr. Powell, good to see you again. Appreciate your being here. I am interested in your perspective on how we are going to deal with a real threat, which is the rising temperatures on the planet, the climate change we are seeing, the obvious consequence of that, which is already being borne out in some ways.

And yet at the same time, we have the nations that are emitting more and more and that are growing their emissions are nations that are not as wealthy as us, whether it is Indonesia or the Philippines or India.

China, obviously, has an economy almost the same size as ours—it will pass ours within the next decade—but not a wealthy country on a per capita basis relative to us, and how to get these countries to adopt emission-saving technologies it strikes me as being a very high lift.

And so I am wondering how do we address this issue? We can all talk about goals. But if we establish goals that are 40 years out, then the reality is these politicians that establish them recognize they will be long gone and someone else is going to have to deliver on them.

So what can we do that that actually has some prospect of reducing the emissions on our planet?

Mr. POWELL. Thank you so much, Ranking Member Romney. Thank you as well for your leadership on this issue, for your membership in the bipartisan Solutions Caucus for working so hard on this bipartisan infrastructure deal, which would have a significant, I think, implication on what we are discussing here today.

Goals are terrific. When I was in the private sector working with very large organizations, we often found it very helpful to set aggressive goals.

But as you said, those goals need to be in the moderately near term. They need to be very specific and you need to have at least some idea that you have a toolkit in place that you can take action on to achieve those goals.

I think right now the problem is that we are asking the rapidly developing countries of the world to change their trajectory and to

do something very different than the way we developed our own economy.

But we have not given them the tools in order to do that. So much of the rest of the world sits on, literally, effectively infinite coal reserves.

If you look at Indonesia, South Africa, India, China, right, as long as that remains the most economical technology to use, they are very likely to continue to use those reserves, and that is how we developed our economy. It is hard to blame them for that.

We need to provide a better like for like substitute to very cheap, very reliable, high-performing quick to build coal technologies, especially the subcritical coal technologies that are the older, less efficient things that are being built in so much of the world.

The good news is we know many of the candidate technologies to do that. We know that that is probably some combination of continued use of fossil fuels.

But with carbon capture that turns that CO2 into either a commodity or that safely stores it underground, or it is advanced nuclear energy that is also very power dense and could be sited on a small footprint of land where it is enhanced geothermal, or it is some combination of other renewable resources but combined with really long duration storage technologies.

So we know it is some combination of those. It is probably a portfolio of those things. And the good news is in the Energy Act of 2020 that you passed back in December, you established a moon shot program to demonstrate those technologies.

We now here in the United States have very aggressive statutorily-mandated goals to demonstrate that whole suite of technologies. Some are between 2023 and 2027, based on the technology. You all are in talks right now about, potentially, funding those demonstration programs.

Once those are stood up and developed and demonstrated here in the United States, then we really need to focus on assembling realistic financing packages and technological expertise to get that into the developing world.

Right now, China will offer those developing countries virtually anything they want to build. That is usually the cheapest technology.

We have got to have a realistic alternative package and we have got the development finance and export credit agencies to do that. But we could do a lot more with what we have and we could do a lot more to beef up the resources of those agencies.

Senator ROMNEY. So China is adding to the problem by building new coal facilities around the world. People want coal plants. They will build a new coal plant and that will be spewing CO2 and other greenhouse gases into the environment, no friend to the planet, despite what they say they are going to be doing themselves.

It sounds to me like you feel that the answer for the world is technology, not necessarily some breakthrough, you know, cold fusion or something that we cannot even imagine but instead saying, okay, how do we take known technologies—or some perhaps we do not even know yet—how do we take these, commercialize them in a way that is inexpensive such that a country like Indonesia that

has ample coal reserves would say, okay, I will use this other technology because it is about the same cost.

Is that what you are saying?

Mr. POWELL. That is exactly what I am saying. The good news, again, is that we have things that are near the finish line.

But, unfortunately, that first breakthrough, that first pilot or small-scale demonstration is a long way from having something that is actually cost effective enough to deploy it at global scale.

You know, energy planners around the world and I have worked with them in Southeast Asia—they are very conservative, just like they are here in the United States.

They are responsible for electrifying their economies, for keeping the lights on as often as possible, for keeping hospitals and cold chains and all of these very, very important facilities up and running in their economies. They need to see something that they can believe in.

They need to see something that they have a reasonably good chance is going to be built and developed in a presidential cycle, in many cases, in their home country, so that they can also get the credit for having built the thing.

And they need export credit. No large facilities are built anywhere in the developing world without the sovereign backing and guarantee of someone on the creditor and vendor side.

And so if that is not going to be the China Belt and Road Initiative, that needs to be some combination of the United States and our allies and some combination of our collective export credit.

Senator ROMNEY. Let me ask you in that regard with regards to carbon capture, where are we in carbon capture? I understand that the Chinese are doing a major facility in carbon capture.

Where is the technology here? Do we have companies that are actually making real progress there? What more should we be doing there? What kind of hope do you attribute to carbon capture technologies?

Mr. POWELL. Just like China has taken the lead in solar photovoltaic cells, I think it is fair to say the United States has taken the lead in carbon capture technologies.

We have one of the largest best developed carbon capture industries here in the United States. We already capture and safely sequester or use for enhanced oil recovery, literally, millions of tons of carbon dioxide every year.

We have got 5,000 miles of carbon dioxide pipeline. That sounds like a lot, but it is not a lot compared to the rest of our infrastructure for hydrocarbons in this country.

The key now is further deployment to bring down the cost. I would say carbon capture is today, perhaps, were wind or solar were 10 years ago. So we now fully understand the technology. We understand how it works. We have piloted a lot of things.

But we have got to deploy a lot of it to bring it down the learning curve so that it is actually ready to go for the really challenging conditions in the developing world.

Senator ROMNEY. Thank you.

Ms. Goodman, you heard from Mr. Powell that, at least from his perspective, that the answer to reduce global emissions really focuses on developing technologies and further applying technologies

that would be adopted in the parts of the world that are growing fastest, that are adding massive amounts of CO2 to the environment—China, Indonesia, Brazil, India.

Is that an approach that makes sense to you? Ms. Goodman, do you subscribe to Mr. Powell's perspective?

Ms. GOODMAN. I subscribe to the perspective that we can best lead in a race to the top by seeking our own American competitiveness with those technologies that Rich Powell mentioned.

I think they are all very good and I think also, from a national security perspective, many of them are very useful to enhance and make more secure the defense mission.

Where there is an alignment between the needs for the military mission and opportunities to lead by example in a broader commercial sphere you get a double benefit.

So, for example, the Defense Department leases over 150,000 vehicles a year from GSA and those can be electrified, and that can lead to greater electrification of the vehicle transport system in the U.S.

We use micro grids and other renewable technologies at forward operating bases in remote places. Many of those are similar to small villages around the world that also need similar technologies that can operate off grid, and that is going to be extremely valuable.

So I think there are many ways, from small modular reactors to various types of advanced micro grids and energy storage technologies to climate predictive analytics, that are going to be useful to enable various sectors such as agriculture, transportation, and defense planning to have better analysis and climate prediction at the granular scale to plan future security risks and prevent them, that there are opportunities both to lead by example that enhance the defense mission and at the same time provide commercial and global competitiveness and benefit.

Senator ROMNEY. Thank you. I will ask one more question and then turn to the chairman, who just got back. I will give him a chance to look at his notes here.

If I had $1 trillion to spend or $2 trillion to spend, if I were, deciding all by myself how we, as a nation, would spend funds relating to climate change, and I will not say over what period, but I guess there is a question as to where would that money be most effective in reducing the emissions into the planet?

Would it be that we, for instance, do a better job insulating old buildings and getting people to drive vehicles that are more fuel efficient here in the United States?

Or would it be investing in new technologies, carbon capture, perhaps small-scale nuclear power plants, other sources of energy generation, cement manufacture, technology innovations, and so forth, that would be adopted here and around the world?

I am not telling you that you have to put all your money in only one bucket. You might say, well, I would take 80 percent and put it in one and 20 percent in the other. But how do you see that priority and where we should be investing our resources?

And I know my Democrat friends may be tempted to say, we will just spend as much as we need in all the categories. But I know there is some limit as to how much you can spend.

So assuming that, where should we devote the bulk of our resources if we are really interested in reducing the CO2 going into the environment and other greenhouse gases and actually seeing the global temperature kept at a 1.5-degree Celsius target?

Yeah, I will start with Mr. Powell. Thank you.

Mr. POWELL. Unsurprisingly, Senator, I think I would put the vast majority of the resources in the latter bucket, which would be to really effectively demonstrate a whole suite of these technologies, and as you mentioned, not just in the clean power sector but also thinking really seriously about how do we rethink steel production and concrete production.

How do we think about retrofitting all the fuel in the world and replacing it with clean hydrogen over time as opposed to the existing traditional hydrocarbon fuel over time?

So I think there is a significant pool of resources for that demonstration program. I think there is another significant pool of resources for smart incentives so that we deploy all of those things and sort of test them and demonstrate them in our markets while we rapidly bring down the cost.

And then there is a third major pool of incentives around export credit and development finance investment in the rapidly developing world to scale those things up.

The last thing I will say is that you can magnify all of those investments if you reform the permitting structure within the United States so that the same pool of resources gets you further because it does not have the same cost in time and permitting costs in actually developing and demonstrating all that here in the U.S.

Senator ROMNEY. Thank you, Mr. Powell.

Ms. Goodman, do you want to answer the same question?

Ms. GOODMAN. Well, I agree with much of what Rich said. I think that we have to be able to walk and chew gum. We have to show leadership here at home in our own transition at the same time that we want to move markets overseas and show American competitiveness in these areas and help those.

It may be a race to the top, but we have to help those who are at the bottom as well. And so I think that we can lead with technology, demonstration tests, and deployment and enabling our own private sector to compete better commercially and have a viable alternative to China's Belt and Road Initiative.

I think that is going to be much to our strategic advantage because our security in the region depends not only on military security, but now, as we see, commercial energy and environmental security.

They, in fact, all go together, and we have to keep in mind also that there are many opportunities in nature-based solutions in all of these sectors that we are talking about that need technology advancement and rapid development as well.

Senator ROMNEY. Thank you.

Now having taken advantage of three rounds of questions for myself, I turn to the chairman.

[Laughter.]

Senator MARKEY [presiding]. Those were all great questions, and I agree with much of what you are saying.

And I think that this panel really can help us a lot, and I want to go back again, if I could, to you, Ms. Goodman.

Back in 2007 when General Sullivan was testifying, he talked about being the general in charge of making the decision to send in U.S. military to Mogadishu and that the ultimate result was Blackhawk down.

And that as he, by 2007, had a chance to reflect back on 1993, he realized that it was a drought that had led to a famine that had left different groups in that country now fighting over scarcer resources.

And now we are 14 years further along in this storyline and we really have not begun to come to grips with what the national security implications will be for our country because our country is the one that has to move out to try to make sure that there is stability on the planet.

So can you talk about what has happened in the last 14 years, from your perspective, to the planet that makes it even more dangerous than it was back in 2007 when you had General Sullivan so graciously testify before that climate committee?

Ms. GOODMAN. Well, thank you, Senator Markey.

We have seen the unprecedented accelerating risks and threats of climate change since 2007 where temperatures in the Arctic, for example, we knew were already warming then.

We said they were warming at twice the rate of the rest of the planet, and now sometimes it is almost three times the rate of the rest of the planet. We will have ice-free summers in the Arctic and open shipping seasons within the next decade or so.

And then we have seen these typhoons that Marinel talked about, Haiyan. But, we now see even more of them on a regular basis, and the confluence of the three major hurricanes across the Atlantic just a few years ago also is evidence that extreme weather events are fueled by climate change, and the unprecedented heat in the Northwest so devastating to people who are unprepared for it. We have seen major deaths and now the flooding across Europe, in Germany, in particular.

So we are living it on a daily basis. In 2007 we called it predicted climate change. But now we know it is here. It is here and happening every single day.

We see it just here in the coast of Massachusetts. We have lost a lot of the beachfront area from warming temperatures and sea level rise.

We know that it is happening, and now finally, it is being developed into plans and strategies that can be acted upon by the Biden administration.

So they have taken the work that we and you and others have done over the last decade and a half and put it into this very, very ambitious climate executive order with many different requirements, from a climate risk analysis to climate assessments by every agencies to the first national intelligence estimate on climate change.

So many, many wheels are turning and I think it will be very useful for this committee to hear later this year and next year about the results of those analyses, and then also to see how the actions recommended are being financed.

Because, as we say, a strategy without resources is hallucination. So, you have to have the funds committed to actually make those wheels turn and enable, for example, a very constructive, let us say, Pacific engagement strategy which will enable us to work with our allies and partners in the region, perhaps in advance of the next typhoon or to make more resilient their communities, but also to enable better disaster risk response and preparedness.

Senator MARKEY. You are up on Cape Cod right now, and with the exception of the Arctic, it is the second fastest warming body of water on the planet. The Gulf of Maine, which is where Cape Cod is, is the second fastest warming body of water.

We can see it with the cod moving north. They need cold water. The lobster moving north. Good news for Canada if they want to completely capture the lobster and the cod industries, but bad news for Massachusetts. Mother Nature is sending us a warning and it is impacting us economically.

The Arctic is affecting us from a strategic perspective. There are tremendous implications the longer we ignore this issue.

So let me move back over to you, Mr. Powell. I had dinner last week with the head of the International Energy Agency. What he said to me was this, very simply.

We have off-the-shelf existing technologies that can meet our international goals over the next 10 years. We do not need any innovation breakthroughs. We just use off-the-shelf existing technologies, we can meet all of our goals.

After that, we need big innovation breakthroughs if we are going to meet the 2050 goals. But between now and 2030, 2035, we can do it with existing technologies.

Do you agree with that framework in terms of what the sequencing has to be if we are going to meet our 2050 goals?

Mr. POWELL. Thank you very much, Mr. Chairman. Thank you, by the way, for your longtime leadership on this. I actually happened to be at that same dinner and I thought that Dr. Birol's comments were very, very insightful, especially in the wake of the really interesting and somewhat troubling analysis that they conducted at the International Energy Agency.

I think it depends a lot on what our goals are by 2030. I do agree that there is an enormous amount that can be done with existing technologies.

We have seen an enormous improvement in the cost profile and the performance profile of solar and wind technologies, of efficiency technologies, electric vehicles, et cetera.

That said, if we start to look at deep de-carbonization, especially outside the power sector, we are, obviously, a lot further off.

Let us just look quickly at the industrial sector, you know, so the challenge of clean steel, clean concrete, clean petrochemicals, finding some way to supply a cross-cutting source of heat for heavy industry, for glass, and pulp and paper and all these things.

We are not even near having something that can be deployed across all of that within the next decade, and so I think it goes sector by sector, and for some sectors we are a lot further behind than in others.

Senator MARKEY. But in general, to meet the 50 percent reduction goal by 2030, and including the utility sector, the vehicle sec-

tor, but knowing how difficult it is in cement, in other technologies, I think what he was telling us was that in order to make the breakthroughs in those areas we are going to need big innovation breakthroughs, and that would be 2030 to 2050.

Do you agree with that framework, in general?

Mr. POWELL. I think I agree that the one place I would have concerns, especially going very, very large with variable renewables, especially in the United States, is really more on the permitting side than on the economic side.

If you look at the recent analysis that was released by the Lawrence Berkeley National Lab just at the interconnect cues for new renewable projects across the country, you know, average time to interconnect three years, in California eight years.

So if you are thinking, what are California's goals in 2030, well, they better have applied for the interconnects for all the projects for that two years from now.

I think if we can find some way to radically speed up the progress of deploying the existing technology, I could align with that. But I think that does remain a hurdle.

Senator MARKEY. But those are not technology innovation breakthrough issues. Those are ——

Mr. POWELL. Very true.

Senator MARKEY. Can we make our system work, please? Can we do permitting coordination amongst states and get the interconnectivity issues resolved? That is not a technological breakthrough. I think that is what we were being told.

It is not a technology problem. It is a political problem that we have been facing. If we can just get the politics right, get out of the way, and deploy what we have already got, get half the problem done and then the breakthroughs can happen.

I think there will be an incentive for companies all across the country to make the breakthrough in these other areas because the momentum will have built to such a point where it will be clear to the cement industry, to the steel industry, to others, that they are going to have to move as well.

Therefore, there is a huge opportunity to become extremely wealthy if you make the breakthrough in the new technologies that will help them achieve it. Ultimately, those market forces will drive that technological change.

So let me let me come back to Ms. Ubaldo and talk to you because you are there in the Philippines suffering from the worst, most catastrophic consequences of this incredible change which has taken place in terms of typhoons and other climate and ocean impacts upon your country.

What do countries like the United States have to do in order to support still-industrializing nations to fight against climate change?

Ms. UBALDO. Thank you so much for the question and for allowing me to talk.

In the Philippines, we call for the centralization of technologies and develop local capacities to understand and access technology for both broad mitigation and adaptation purposes.

We also call for support for local technologies as well as the freeing up of critical technology, intellectual property rights to help

communities, and also we call for end on false solutions such as carbon capture and storage, geoengineering, among others.

We also call on governments, not just actually the Philippines but also our global leaders to stop the financial institution and all investing institutions to divest from dirty energy and enhance their investment portfolios with renewable energy. We also call to phase out existing coal plants and resist from building new coal-fired power stations.

In the context of climate justice, any replacement such as hydro or nuclear power must take into consideration the impacts they have on the environment. I also have noted that in climate negotiations, especially with the global leaders, the implementation and operationalization of the Paris Agreement should also be highlighted and to support the developing countries in terms of climate finance to reach the ambitious targets of our nationally determined contribution.

As the representative of the youth sector and from a vulnerable country like the Philippines, I strongly believe that coming up with strong action points at the climate negotiation is greatly important.

While we recognize that there are so many issues that our global leaders need to iron out, but it is equally important that we have concrete ways forward after such event like this, and we can implement in our countries and local communities.

We heard all the amazing plans of our leaders in achieving net zero, but these remain—if these remain as ideas and in papers, all our efforts will be futile. We need these to be operationalized and be funded to increase the resilience of our local communities and reduce their vulnerabilities.

If we continue to remain at the negotiating table without implementing these plans on the ground and also consulting the women, the children, and all those vulnerable sectors, we fear that this will jeopardize our future.

Senator MARKEY. Thank you. Thank you for that great answer and thank you for just being an inspiration as an activist not just in your own country but across the planet. It is really young people who are rising up. They are the ones who have created this energy around this issue.

Back in 2009, as the chair of the Climate Committee, I was partner with Henry Waxman, to pass a law through the House of Representatives that reduced greenhouse gases by 80 percent by the year 2050. It was killed over here in the Senate.

But we did not have a movement at that time, and we now do thanks to people like you, Ms. Ubaldo, and young activists all across our country and all across the planet. The Europeans now call their climate plan the Green Deal. We have just had a change, a sea change, politically.

We have a chance to do something big right now, inspired by courageous young people, like yourself. Thank you so much for all you are doing.

Let me finish up here by asking each of you to give us the one minute piece that you want the subcommittee to remember about what we have to do in order to deal with this question responsibly, and historically.

So we will begin with you, Mr. Powell.

Mr. POWELL. I am going to use part of my minute to reiterate something that Ms. Goodman said, that a strategy without resources is hallucination.

We need to develop a strategy to combat climate change but we need to establish the tools to actually do that and to get the entire global economy to much lower emissions.

We do think that the way to do that is to start by innovating that new breed of advanced clean energy technologies across all the sectors for our global economy, including things that are very relevant for the rapidly developing world.

We need to reform the permitting process so that we can quickly demonstrate them in the United States, and then we need to build them here and build enough of them to rapidly bring down the costs.

And finally, we need to do much more to export those into the rapidly developing world to push back against the coal finance of the Belt and Road Initiative, and to make it an actual realistic solution for so much of the rapidly developing world to choose clean, as opposed to traditional, emitting technologies.

Thanks very much.

Senator MARKEY. Beautiful. Thank you.

Ms. Goodman, your final piece of advice for us, please.

Ms. GOODMAN. Well, thank you, Chairman Markey.

I think we need climate-informed decision making across all of our foreign policy and defense strategies, and I know you and others on this committee will be asking those direct questions, and it is so clear in the Indo-Pacific we are so vulnerable. We absolutely need that.

Second, we need to work even more closely with our allies and partners to show them that we care about their needs and their climate risks, and that we are working together so they are less vulnerable both to the climate risks and to China's encroachments.

And third, we need to improve the resilience of our force and base structure throughout the region and in the U.S. because that is going to be key to enabling us to continue to perform our missions in the region.

Senator MARKEY. Thank you, Ms. Goodman.

And, Ms. Ubaldo, you have the final minute of this hearing.

Ms. UBALDO. Thank you so much. So in his encyclical Laudato Si' on Care on the Common Home, paragraph 49, Pope Francis said, "We have to realize that a true ecological approach always becomes a social approach. It must integrate questions of justice and debates on the environment so as to hear both the cry of the Earth and the cry of the poor."

I am here in front of you virtually, not just as a climate statistic you see in the news, but I am here as a human being hoping to remind you that we need to value lives again.

And I am also here to speak on behalf of the vulnerable and the marginalized communities. May our stories motivate you in prioritizing climate actions?

We should be part of the negotiation table, not just someone telling a sad story but not really listened to, to make our voices be heard.

Thank you.

Senator MARKEY. Beautiful. I think that is just the right sentiment for us to end this hearing.

I think that, ultimately, the United States has to be the leader. We are the technological giant of the plan, and when we set our minds to ensuring that we were going to move from no one with a flip phone in their pocket to everyone with a flip phone in their pocket, to everyone having a device in their pocket equal to the computer on the Apollo mission, we did it, and in villages in Africa, in Asia, in South America, people now have that computer in their pockets, transforming the way in which they live.

We can do the same thing in the energy sector. But the U.S. has to lead. We need a plan, and if we lead this plan then I think the rest of the world will follow, and China will either partner with us or the rest of the world will just have to move on without them, ultimately, lose this opportunity.

So all of you have given us, like, Cassandra like warnings of what happens if we do not move, and it is going to be heeded by this committee and others across this city.

We cannot thank you enough for all your great testimony today.

With that, this hearing is going to be adjourned but not before I tell all of the members that the record will stay open, and they will have until the close of business Friday, July 23rd, to revise and extend their remarks and submit questions for the record.

And with that, this hearing is now adjourned.

[Whereupon, at 4:24 p.m., the subcommittee was adjourned.]

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