S. HRG. 110–652

INTERNATIONAL DEFORESTATION AND CLIMATE CHANGE

HEARING

BEFORE THE

SUBCOMMITTEE ON INTERNATIONAL DEVELOPMENT AND FOREIGN ASSISTANCE, ECONOMIC AFFAIRS, AND INTERNATIONAL ENVIRONMENTAL PROTECTION

OF THE

COMMITTEE ON FOREIGN RELATIONS
UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

APRIL 22, 2008

Printed for the use of the Committee on Foreign Relations

Available via the World Wide Web: http://www.gpoaccess.gov/congress/index.html

U.S. GOVERNMENT PRINTING OFFICE

45–735 PDF WASHINGTON : 2008

For sale by the Superintendent of Documents, U.S. Government Printing Office
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INTERNATIONAL DEFORESTATION AND CLIMATE CHANGE

TUESDAY, APRIL 22, 2008

U.S. SENATE, SUBCOMMITTEE ON INTERNATIONAL DEVELOPMENT AND FOREIGN ASSISTANCE, ECONOMIC AFFAIRS, AND INTERNATIONAL ENVIRONMENTAL PROTECTION, COMMITTEE ON FOREIGN RELATIONS,

Washington, DC.

The subcommittee met, pursuant to notice, at 10:01 a.m., in room SD–419, Dirksen Senate Office Building, Hon. Robert Menendez, chairman of the subcommittee, presiding.

Present: Senators Menendez, Kerry, Lugar, and Barrasso.

OPENING STATEMENT OF HON. ROBERT MENENDEZ, U.S. SENATOR FROM NEW JERSEY

Senator MENENDEZ. Good morning everyone. This hearing of the Subcommittee on International Development and Foreign Assistance on the international deforestation and climate change hearing is now in order.

Let me welcome our panelists. We appreciate you being here. I will introduce you formally in a moment.

Let me wish everyone a happy Earth Day. It is an appropriate day to be having this hearing.

I will start off with an opening statement and we will recognize other members as they come.

Let me thank Chairman Biden and Ranking Member Lugar for their continued strong leadership on climate change. Recently they sent a letter to committee members reaffirming the committee's commitment to closely monitor international climate change negotiations and ensure that the Senate is intimately involved in this process. They also indicated that this subcommittee would play a key role in holding hearings and building a record so that the Senate is ready to ratify a multilateral climate change treaty within the next 2 years.

There is little doubt that addressing deforestation and degradation would be a critical part of any post-Kyoto climate change treaty, and I think it is fitting that we are holding this hearing on Earth Day. Thirty-eight years ago today, the first Earth Day was observed. It has become a day to spark awareness and a day to remember the vast gifts this planet has given us. This global perspective is essential if we hope to solve our planet's climate crisis.

In negotiating the post-Kyoto treaty, we must all be cognizant of the challenges and opportunities different countries face in lowering their greenhouse gas emissions. There is no doubt that we

must all protect U.S. interests, but our planet is in peril and we are all going to have to work together to fix it.

But what does working together look like in the context of a multilateral climate treaty? In my mind, it means at least three essential things.

First, working together means the United States must be respectful of the fact that different countries face different circumstances. Therefore, we cannot expect every country to commit to the same constraints on carbon that we do.

Second, we must be prepared to help developing nations create the capacity needed to reduce their emissions and grow along a greener and cleaner path.

And third, we must hold every nation, including major emitting developing nations, accountable for implementing strong policies that will result in emissions reductions.

Only through such a cooperative framework will we successfully negotiate a treaty that achieves the emissions reductions we need but is able to be signed and ratified by developed and developing countries alike.

Efforts to slow the rates of deforestation and degradation of tropical rainforests could prove to be the critical linchpin in this cooperative process.

As Ambassador Eizenstat will explore in more detail in his testimony, avoided-deforestation was not covered by the Kyoto treaty. Deforestation was not addressed, in part, because there was a real distrust in the capacity of forested nations to effectively enforce policies designed to protect tropical rainforests. This distrust was not unfounded. In 1990, there was an international effort to provide $1.5 billion to help Brazil reduce deforestation. Yet, from 1990 to 2004, the rate of deforestation doubled.

Another reason Kyoto did not give credit for avoided-deforestation was because it was nearly impossible at the time to monitor rates of deforestation.

Fast forward to Bali, Indonesia. Avoided deforestation of tropical rainforests has become a major part of the framework for a post-Kyoto climate treaty.

So what has changed?

One thing that has changed is technology. As Dr. Gurney will testify, satellite technology has now advanced to the point where rates of deforestation can be measured more accurately and more quickly. However, this is an evolving field and we need to be careful that our policy mechanisms do not get out in front of the technology needed to implement them.

The world is also more committed to stopping deforestation because we have a fuller understanding of just how critical rainforests are to regulate the climate. We now understand that rainforest destruction accounts for 20 percent of global greenhouse gas emissions and that the world's forests contain 50 percent more carbon than the entire atmosphere.

Another reason attitudes have changed about including avoided-deforestation in a climate treaty is the sense of opportunity. Billions of dollars are now flowing to help developing nations clean up their energy infrastructures in order to reduce greenhouse gas emissions. As Mr. Forrister will testify in more detail, developing

nations with rainforests are now asking why they cannot enjoy the same sort of financial support to reduce rates of deforestation.

Simultaneously, many companies in developed nations are looking for ways to lower future compliance costs under a carbon-constrained economy. Tropical rainforest protection is seen as one of the cheapest ways to reduce greenhouse gas emissions. So perhaps market-based mechanisms where companies can gain carbon credits for investing in avoided-deforestation projects could be part of a solution to our climate crisis.

That said, there are many obstacles to creating a market-based forest protection system that will work. On Saturday, the New York Times had a piece that described quite well how difficult it has been for Brazil to protect large swaths of rainforests even when they commit tens of millions of dollars and hundreds of officials to the endeavor.

Mr. Hayes will discuss some of these challenges in his testimony, including the challenge of leakage. If we allow companies to invest in an avoided-deforestation project in a particular region, what prevents loggers from just moving to another section of the forest? The answer has to be that baselines of deforestation must be made for any country that hosts international deforestation projects and that these nations and the holders of credits from projects in this nation must be held accountable for results. A market in carbon credits is only as strong as the market's confidence that the credits actually correspond to real carbon reductions.

Finally, while these rainforests may be located within the boundaries of a given country, the consequences of their destruction are global.

I look forward to hearing from the distinguished panel on all of these topics, and I hope we can all develop a deeper understanding of what must be done to protect the world's rainforests and what must be done to protect all of us from the destructive consequences of climate change.

With that, I am pleased to recognize the distinguished ranking member of the full committee, Senator Lugar.

OPENING STATEMENT OF HON. RICHARD G. LUGAR, U.S. SENATOR FROM INDIANA

Senator LUGAR. Well, thank you very much, Mr. Chairman. I thank you for holding this important hearing.

A year ago today, I was on my farm in Marion County, Indiana, for an Earth Day ceremony recognizing the role of agriculture and forestry in mitigating the social, economic, and political threats posed by climate change. I was joined by Richard Sandor, chairman and CEO of the Chicago Climate Exchange, and Tom Buis, president of the National Farmers Union, to promote how certain no tillage agricultural practices and forestry can sequester carbon dioxide and help offset the environmental threats from excessive carbon emissions.

For a number of years now, we have dedicated about a third of the 604-acre Lugar farm to growing black walnut and other hardwood trees. As these majestic trees grow, they absorb and store carbon from the air around Indianapolis. To highlight the opportunities of participating in the markets for carbon sequestration, the

Lugar stock farm has entered into a binding contract with the Chicago Climate Exchange to provide offset credits to entities that may want to use them to mitigate the greenhouse gases they produce. These markets can be an important tool in our broader climate change policy. And this has given us an opportunity to discuss the subject more broadly in Indiana.

I believe carbon sequestration and many other innovative ideas can change the dynamic of the political debate on climate change, both in the United States and internationally. The debate should be about more than constraints. It should be about how we can use economic incentives and opportunities to change behavior and to influence the personal and societal choices that we make.

Clearly, there are economic opportunities in clean energy sources, solar, wind, and biofuels, and carbon sequestration and storage technologies. But improvements in farming and forestry practice may be among the lowest hanging fruit in the quest to deal with climate change.

During the global climate change discussions in the late 1990s in Kyoto, the concept of carbon sinks provided by forestry and agriculture was taken off the table. But last year during the Bali discussions, the topic of carbon sequestration through forestry and agriculture practices was revived. Now, this is an important development in my judgment. It should be embraced by the United States.

I mentioned the celebration at my farm last year with the Chicago Climate Exchange. More than 20 years ago, we had a similar celebration at my farm when Secretary of Agriculture John Block announced the Conservation Reserve Program. This program has encouraged thousands of American farmers to grow trees on marginal lands, especially along watersheds. Many American farmers participate in this program, but many more should do so because almost every American farm has a back-40 of unused land. Native trees should be planted on this land, and this practice provides income for farmers and climate change mitigation for the world.

I also want to note that 10 years ago, Senator Joe Biden and I passed the Tropical Forest Conservation Act. Since then, more than 47 million acres of tropical forests around the world have been conserved through "debt for nature swaps" in 12 countries. Recently the Foreign Relations Committee passed a reauthorization of this bill, which I am hopeful will be approved soon by the full Senate. This program has given the United States a cost-effective tool with which to promote the preservation of tropical forests, but much more needs to be done, obviously, on a global scale.

All these activities could serve as parts of the foundation for any cap-and-trade system that arises out of legislation in this country or international agreements under the United Nations Framework Convention on Climate Change. A critical element of any cap-and-trade system is the accountability and transparency of the carbon that is being mitigated, sequestered, and stored.

The Chicago Climate Exchange requires me to conduct an annual accounting of my trees, and that is not difficult for only 200 acres of hardwood trees. But how do we analyze tens of thousands of acres of trees in remote areas of the world?

Now, this is one of the questions at the heart of Project Vulcan at Purdue University. I am particularly pleased Professor Kevin Gurney, who leads Project Vulcan, is here to testify today.

Last week, I sent a Dear Colleague letter to Senators depicting one of a series of maps produced by Purdue, along with NASA and the Department of Energy, showing carbon emissions in the United States. This type of mapping technology will be critical to a vibrant carbon trading market in the future and to efforts to quantify the benefits of preserving forest lands.

I welcome all of our distinguished witnesses and look forward, along with you, Mr. Chairman, to their testimony.

Senator MENENDEZ. Thank you, Senator Lugar.

Senator Barrasso.

STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM WYOMING

Senator BARRASSO. Thank you very much, Mr. Chairman. Thank you for holding this important hearing.

I welcome this opportunity to address the climate change issue in the Foreign Relations Committee. I have been an active participant in the Environment and Public Works Committee on this very issue.

I agree with you, Mr. Chairman. Climate change is an international issue, and the United States is a major emitter of greenhouse gases. Yet, China and India are surpassing our country with emissions, and they are the international actors that must be at the heart of any agreement to address carbon releases.

We here in the Senate can pass legislation to provide the incentives to develop the technology we need to be more carbon-neutral. I recently introduced a bill, the GEAR Act, and this legislation seeks technology to remove the excess greenhouse gases already in the atmosphere. It makes sense to me that we explore proposals to remove and permanently sequester those greenhouse gases from the atmosphere to slow or reverse climate change.

And to me the best way to develop the technology we need to achieve this is through a system of financial awards or prizes for achieving technological goals established by Congress. Technology incentives do work. Many will have a beneficial impact on climate change just as they have 500 years ago for us finding a solution to the issue of understanding longitude and how to sail the seas. Charles Lindbergh was competing for a prize at the time that he flew across the Atlantic Ocean. So those are the things that I am working on with the GEAR Act.

I believe Congress must not pass legislation that places caps on our emissions while other countries like China and India are exempt. We risk passing legislation that is long on sacrifice by Americans but short on progress globally.

So I welcome the opportunity to hear the discussion today regarding the role that forests play in cleaning our air. Forests are essentially a carbon sink. They make up the largest portion of carbon stored in terrestrial land masses. That is because trees and plants absorb carbon for growth. Carbon dioxide is released into the atmosphere when these trees and plants are destroyed by things such as wild fires.

In my home State of Wyoming and across the West, we have long been concerned about the release of carbon into the atmosphere from out-of-control blazes. According to one source, the annual worldwide burning of forests, including the fires in the Western United States, release about 2 billion metric tons of carbon dioxide into the atmosphere.

That is one of the reasons that I and many of my Western colleagues have long supported forest health activities such as thinning and removal of fuel loads on the forest floor. It is my hope that that issue is addressed in the upcoming Lieberman-Warner climate change debate that we are holding now in the Senate.

Maintaining the planet's existing tropical forests will store a vast amount of carbon. Up to 30 percent of the carbon dioxide added to our atmosphere over the past 150 years has come from deforestation. The vast majority of carbon stores in these forests has still not been released. So they must be protected. The vast majority of these forests are outside of the United States boundaries. So to preserve these areas, we will need international cooperation and one such tool has been the Tropical Forest Conservation Act that our ranking member, Senator Lugar, has mentioned. A reauthorization bill on this important program has been introduced and I hope that legislation will soon be considered on the Senate floor.

I look forward to working with the members of this committee on this important issue.

Thank you, Mr. Chairman.

Senator MENENDEZ. Thank you, Senator Barrasso.

Before I turn to our panel, let me say that Senator Hagel has a statement for the record, and without objection, we will include it in its entirety.

Let me turn to our witnesses. Let me welcome Ambassador Stuart Eizenstat who is our first witness this morning. He heads the law firm of Covington & Burling's international law practice and is formerly the Deputy Secretary of Treasury during the Clinton administration in which he led the U.S. delegation at the negotiation of the Kyoto Protocol.

Our second witness is David Hayes, he is the global chair of the Environment, Land and Resources Department at Latham and Watkins and will be testifying in his role as the senior fellow at the World Wildlife Fund. Mr. Hayes has extensive expertise on carbon trading, as well as a multitude of forestry and land management issues.

Dr. Kevin Gurney is the associate director of the Purdue Climate Change Research Center and has valuable insights on the role deforestation plays in climate change, as well as the latest technology for monitoring rates of deforestation.

And Dirk Forrister is the managing director of Natsource and has extensive experience with carbon markets. And I am also pleased to see that Mr. Forrister has his J.D. from Rutgers Law School, one of the premier law schools in the world, a school that happens to be in my home State of New Jersey and where I got my law degree as well.

Anyhow, welcome to all of you. In the interest of time, we ask that you keep your testimony to about 7 minutes. We will include

your entire testimony for the record, and with that, Ambassador Eizenstat, if you would start.

STATEMENT OF AMBASSADOR STUART E. EIZENSTAT, PARTNER, COVINGTON & BURLING LLP, WASHINGTON, DC

Ambassador EIZENSTAT. On a personal note, first, Mr. Chairman, may I say how much it is a pleasure to call you Senator, and for the ranking member, I have had the privilege of knowing him since he was the mayor of Indianapolis. He has had such a distinguished career. It is always a pleasure to be before him.

I am very pleased that you are holding this hearing because the Senate Foreign Relations Committee can help bridge the gap between domestic U.S. climate legislation and the international effort dealing with forests necessary to deal with one of the great challenges of our time.

I have been working with the Environmental Defense Fund, the Nature Conservancy, Conservation International, Defenders of Wildlife, the Wildlife Conservation Society, and major corporations, including Shell, AIG, PG&E, AEP, and Duke Energy, to make sure that in any U.S. legislation dealing with climate change that domestic and international forest carbon initiatives are included.

Two important observations at the beginning. First, the forest sector is critical to dealing with climate change. As you have all recognized, it accounts for 20 percent of global greenhouse gas emissions. But to put that in context, that means it is the second largest source of carbon emissions, second only to actual burning of fossil fuels, and it is more than the entire global transportation sector combined.

If one looks at the world's top emitters, such as Indonesia and Brazil, they have achieved that rank not because of their industrialization, but largely because of the emissions associated with deforestation. We cannot solve the climate change problem if forests are not included.

The scientific case is unmistakable. We cannot stabilize the atmosphere, anything remotely close to what scientists believe is necessary, if we leave 20 percent of global emissions out of the effort. But there is also a secondary benefit, and that is, by protecting forests, we also conserve biodiversity. Tropical forests are home to half of the world's terrestrial species and also are important to the livelihood of the world's rural poor.

The political case is equally strong. As I will discuss in a moment, one of the ways to break the logjam that Senator Barrasso mentioned, for example, with China and India, is to incentivize developing countries to break out of the lockstep that I confronted in Kyoto that China and India had by giving developing countries who have forests an incentive through avoided-deforestation credits to protect their forests. That is their contribution and can serve as a central model for electric power and transportation.

Bringing climate change policy through deforestation would also provide linkages between any ultimate U.S. cap-and-trade program that we may have and countries that are already part of Kyoto or a post-Kyoto treaty. I believe, unfortunately, that in the near term, we are not going to have two-thirds in the Senate to pass a treaty, and therefore, we have to find linkages between an ultimate U.S.

piece of legislation and international trading markets. Recognizing credits for reduced emissions from deforestation can bridge the divide with our international partners.

The economic case is absolutely compelling because this is a low-cost mitigation option. It is a way that regulated companies in the United States can cheaply reduce their costs of compliance. It is flexible, and by putting it in our cap-and-trade system and providing international trading in forestry credits, it will mean both incentivizing developing countries to participate but also lowering the cost of compliance.

Permit me to suggest that there are two ways in which to finance efforts to reduce emissions from deforestation. One is to create an international fund, a government-to-government fund. This would be, in effect, foreign assistance provided by a number of countries. The second would be market-based mechanisms to channel private sector capital to developing countries to protect their forests.

Now, frankly, I think we need both, but it is sophistry to expect that we can get a fund large enough. Sir Nicholas Stern, for example, feels we will need up to $10 billion per year to provide adequate incentives for developing countries to protect their forests. To do that alone by foreign assistance—we need to harness the carbon market, which last year was some $60 billion, to deliver capital on a scale needed to have an impact on the problem. And, Senator Lugar, I am on the board of the Chicago Climate Exchange, and they much appreciate what you are doing. But we need to harness that kind of market.

Now, what Bali did, Mr. Chairman, as you alluded to, in the forest area it is recognized for the first time, which we did not fully do at Kyoto, that any climate change regime following Kyoto has to include provisions for what they called reduced emissions from deforestation and forest degradation, or REDD. The Bali Action Plan specifically references incentives to reduce emissions from deforestation and forest degradation in developing countries. And that is a huge step forward because now the international community is clearly recognizing that efforts to conserve the world's tropical and subtropical forests have to be part of any long-term global effort for climate change mitigation.

This is in no small part due to the remarkable efforts of a group of over a dozen developing countries in the Coalition for Rainforest Nations. These are countries who are themselves the stewards of tropical and subtropical forests where most of the emissions of CO_2 are coming from in the forest area. They are saying their part in dealing with climate change will be to take specific measurable commitments to avoid deforestation, if they are provided in an international regime with sufficient incentives to do so. And hopefully, as we will discuss in the question period, with the tremendous pressures on commodity prices, the tremendous pressures to cut those forests down and grow soybeans and other products, we have got to provide a counterweight so that they do not have an incentive to cut the forests down and leave it all to agriculture.

Now, the opportunities for U.S. leadership—and this will be my close—to take a lead on deforestation is to do the following, and that is, that any cap-and-trade legislation, Lieberman-Warner or any variation thereof, should include provisions to recognize credits

from reduced emissions from deforestation in developing countries. Congress can design legislation to allow credits for reduced emissions from deforestation to be traded in a U.S. cap-and-trade system in a manner ensuring environmental integrity three ways, and then I will close.

First, in the current version of Lieberman-Warner, it allocates 2.5 percent of total emission allowances to international forest carbon activities. That percentage could be even increased more.

Second and even more important, the current Lieberman-Warner bill allows regulated entities to satisfy 15 percent of their compliance obligations with allowances from foreign greenhouse gas trading markets. This should be expanded beyond 15 percent, but even more critical is I urge this committee in the strongest terms to include in that provision expressly allowing forestry credits to be counted in that 15 percent or whatever ultimate percentage is selected.

And third is to include provisions in a U.S. cap-and-trade bill that provide incentives to developing countries to move toward what you have suggested, Mr. Chairman, which is a national accounting baseline system so we can measure forests, and if they do so, they should not be subject to any quantitative limitations in their ability to trade credits for avoided-deforestation.

The long and the short of it is this is a win-win situation for everybody. It lowers the costs of compliance by regulated companies in the United States; it provides incentives for developing countries to take actual specific obligations; and it will provide a huge boost in dealing with climate change, reducing our costs in the United States and incentivizing countries abroad to participate.

Thank you again for the opportunity, and I look forward to your questions when the panel has the opportunity to fully give their testimony.

[The prepared statement of Ambassador Eizenstat follows:]

PREPARED STATEMENT OF STUART E. EIZENSTAT, PARTNER, COVINGTON & BURLING LLP, WASHINGTON, DC

Good morning, Mr. Chairman and members of the subcommittee. Thank you very much for holding this hearing and for the opportunity to testify on international deforestation and climate policy. This is one of the most important aspects of the climate change problem and I commend you for your attention to it. The Senate Foreign Relations Committee can help create the bridge between domestic U.S. climate change legislation and the international effort necessary to deal with one of the greatest challenges of the 21st century. During my tenure as Under Secretary of State in the Clinton administration, I led the U.S. delegation in the negotiation of the Kyoto Protocol. Forests were a major source of contention in those negotiations, and although we were able to get credits for afforestation and reforestation projects in developing countries, emissions from tropical deforestation were ultimately excluded from the Kyoto regime. But much has changed since Kyoto was negotiated, and the recent meetings in Bali put the deforestation issue squarely on the agenda of international climate policy—providing a critical boost to efforts to fill the gap left open by Kyoto by bringing deforestation into the international climate regime. I believe that the U.S. has a significant opportunity to lead on this issue—in the international process but also, importantly, in the way that we design our domestic cap-and-trade system.

I currently serve on the advisory board of Sustainable Forestry Management and we have been working with the Environmental Defense Fund, the Nature Conservancy, Conservation International, Defenders of Wildlife, and the Wildlife Conservation Society as well as a number of major companies, including Shell, AIG, PG&E, AEP, and Duke Energy, to develop a Forest Carbon Dialogue that seeks to include domestic and international forest carbon provisions in U.S. climate legislation.

I. DEFORESTATION AND CLIMATE POLICY

There are two important observations that must be kept in mind as we explore options for including deforestation in international and domestic climate policy.

1. *The forest sector is a key part of the climate change problem.* As some of you may know, deforestation—almost all of which occurs in the tropics—accounts for about 20 percent of global greenhouse gas emissions. That is more than the entire global transportation sector. Deforestation is the largest source of emissions in many developing countries—accounting for over 90 percent of the emissions from some key developing countries. Some of the world's top emitters, such as Indonesia and Brazil, have achieved their rank largely because of emissions associated with deforestation.

2. *We cannot solve the climate problem if we do not include forests.* Despite its massive contribution to global climate change, deforestation in developing countries is currently excluded from the international climate regime by the rules governing the first commitment period (2008–2012) under the Kyoto Protocol. This makes no sense scientifically, and it makes no sense politically or economically.

The scientific case for including deforestation in the effort to address global climate change is very strong, as articulated by the recent reports by Sir Nicholas Stern of the U.K. Government and the Intergovernmental Panel on Climate Change, among others. We simply cannot stabilize the composition of the atmosphere at anything remotely close to what scientists consider a prudent level if we leave 20 percent of global emissions out of the effort. In addition to the obvious climate protection benefits that come from reducing emissions from deforestation, protection of tropical and subtropical forests also generates significant social and environmental cobenefits, including the conservation of biodiversity (tropical forests are home to half of the world's terrestrial species), the maintenance of critical ecosystem services, and the protection of livelihoods for many of the world's rural poor.

The political case is equally strong: Finding a way to bring deforestation and forest restoration into the climate regime offers the only meaningful path for many developing countries to participate in international efforts to deal with climate change, since regrettably they are opposed to economywide targets, even growth reduction targets, as we learned at Kyoto. And without developing country participation, there will not be an effective post-2012 international climate regime. Put another way, the forests issue provides a possible way to break the logjam plaguing the Kyoto process by creating opportunities for certain developing countries to receive tradable credits for reducing their emissions from deforestation. This, in turn, could serve as a model for similar approaches in other sectors, such as electric power or transportation, allowing developing countries to take important steps without having to embrace Kyoto-like economywide commitments from the start, which is highly unlikely in the short term.

Bringing deforestation into climate policy also provides a possible linkage between a U.S. cap-and-trade program and trading systems in nations that are part of the Kyoto and post-Kyoto process. I believe it is unlikely in the near term that the U.S. Senate will ratify a climate change treaty without specific commitments from China and India, which they are unlikely to provide. Recognizing credits for reduced emissions from deforestation in evolving compliance regimes can therefore help bridge the divide with our international partners.

And, of course, the economic case for including deforestation in the climate regime is compelling given that this is a low-cost mitigation option that is available now, as both the Stern Report and the IPCC have noted. Accordingly, we should be developing mechanisms to take advantage of these reductions as we work toward the fundamental transformation of our energy system. From the U.S. domestic perspective, recognizing credits for reduced emissions from deforestation in our own cap-and-trade system could therefore provide significant cost-control benefits and much needed flexibility to regulated entities in the U.S., as they move toward adoption of low and no carbon technologies. Allowing regulated entities in the U.S. to satisfy part of their compliance obligations with international forest credits is like allowing them to design their supply chains in a manner that takes advantage of cheaper inputs. A key beneficiary is the U.S. consumer, who pays lower prices for the goods and services produced by these U.S. companies. Forest carbon is a critical part of the effort to control compliance costs in a U.S. cap-and-trade system.

Finally, efforts to bring international deforestation into the climate regime also have important synergies with efforts to promote and enhance adaptation to climate change in developing countries. Given the vital role of forests in providing environmental goods and services, recognition of credits for international forest carbon activities would generate numerous environmental cobenefits, including restoration of degraded lands and watersheds, improved habitat, reduced erosion, clean water, and

enhanced ecosystem services—all of which enhance the adaptive capacity of rural communities. Efforts to protect forests and promote sustainable forestry are also critical components of an effective strategy to reduce migration and conflict among vulnerable rural populations, thereby promoting environmental security. By channeling much-needed capital to the rural poor and providing incentives for them to sustainably manage their landscape, forest carbon credits could reduce pressures that lead to migration and conflict. Indeed, forest carbon credits provide one of the only means by which many of the rural poor in the developing world can stabilize their local forested environments and themselves adapt to climate change.

Simply put, we believe that reduced emissions from deforestation, together with efforts to plant new trees and restore forests, must be part of the solution to global climate change. It is certainly not the solution by itself, but we cannot achieve real climate protection without including forests.

II. POLICY OPTIONS AT THE INTERNATIONAL LEVEL FOR FINANCING EFFORTS TO PREVENT DEFORESTATION

The current international policy debate has identified two main options for financing efforts to reduce emissions from deforestation:

1. An international fund (or collection of funds) that channels money to developing countries in order to finance forest protection efforts. This money could come from a variety of sources, including Overseas Development Assistance (ODA), carbon taxes, emissions allowance auction revenues, or debt-for-nature transactions. The important point is that this would depend on public sector, government-to-government financing.

2. Market-based mechanisms that channel private sector capital to developing countries in order to fund forest protection efforts. The basic idea here is that existing and emerging cap-and-trade systems could be designed to recognize credits for efforts to reduce emissions from deforestation and thereby leverage potentially significant flows of private sector capital for efforts to reduce emissions from deforestation.

In evaluating these two options, several key points should be kept in mind:

First, in order to have a meaningful impact on the problem, significant and sustainable flows of capital must be mobilized. The Stern Review, for example, estimates that it would take between $5 and $10 billion per year to significantly reduce deforestation in developing countries. It is highly unlikely that ODA or some other type of public financing could realistically provide this level of investment on a consistent and sustainable basis over time. My view is that it cannot. Although multilateral and bilateral funding sources have an important role to play in this effort, we must harness the carbon market—which doubled in size in 2007 to $60 billion—as a vehicle for delivering capital on the scale needed to have an impact on the problem. Having a fund is not inconsistent with using market-based mechanisms. Both can play a role, but market-based mechanisms are far more powerful in leveraging private sector investment.

Second, regardless of which policy instrument (or combination of instruments) is put in place to deal with the problem, careful attention must be given to monitoring and quantifying changes in forest cover and forest carbon and to the development of appropriate accounting frameworks for measuring progress and ensuring environmental integrity. Without environmental integrity, the whole effort will collapse. In contrast to the situation prevailing a decade ago at Kyoto, significant progress has been made, particularly in the development of remote sensing capabilities and accounting methodologies, and in our ability to quantify changes in land cover and forest carbon stocks with confidence.

Third, deforestation cannot be considered in a vacuum and there is no one-size-fits-all recipe for solving the problem. Regardless of how the financing for reduced emissions from deforestation is ultimately designed, careful attention must be given to the promotion of policies and projects that will address the fundamental drivers of deforestation—drivers that vary within and among countries. Integrated approaches will be necessary to provide meaningful and economically rational alternatives to deforestation, which means that we must look at afforestation and reforestation projects in addition to and as complements of avoided-deforestation efforts.

III. THE CURRENT STATE OF INTERNATIONAL NEGOTIATIONS TO CREATE MECHANISMS TO PREVENT DEFORESTATION

The 13th Conference of the Parties to the United Nations Framework Convention on Climate Change, held last December in Bali, Indonesia (COP–13), produced three major outcomes:

First, COP–13 defined a path forward for the negotiation of a comprehensive agreement to take effect when the Kyoto Protocol's first commitment period ends in 2012. This is the so-called "Bali Action Plan." Notably, the United States joined the global consensus to launch this negotiation process.

Second, the developing countries assumed at least some qualified responsibility for reducing their own greenhouse gas emissions, within the context of their own economic development and with the assistance of wealthier countries. This is a significant development. It opens the door to an eventual agreement that will in some manner address the critical role of China, India, and certain other G–77 countries that already are—and will be with further economic growth—major contributors to climate change in the decades to come.

Third, and most significant for our purposes here, was the recognition by all countries that whatever climate change regime emerges in the next round of negotiations, it should include provisions for Reduced Emissions from Deforestation and forest Degradation (known as "REDD"). To that effect, the Bali Action Plan specifically references the importance of addressing, in the context of the post-2012 agreement, "policy approaches and positive incentives on . . . reducing emissions from deforestation and forest degradation in developing countries." This represents an important step in the direction of filling the gap left open by Kyoto and including deforestation in international climate policy.

Concurrently with the Bali Action Plan, COP–13 adopted a decision specifically on REDD, focusing on "approaches to stimulate action." This additional decision, which I will refer to as the "REDD Decision," calls for countries to undertake immediate efforts, including demonstration projects and activities, to begin to address the drivers of deforestation and to determine the efficacy of various different approaches. Those early efforts are meant to be taken into consideration—and, presumably, credited in a post-2012 regime—when the eventual framework on "policy approaches and positive incentives" is ultimately agreed.

Attached to the REDD decision is a set of principles meant to provide "indicative guidance" with respect to the nature and goal of these demonstration activities. Of particular interest is the question of precisely how these demonstration activities, if conducted at a subnational level, will contribute ultimately to the development of "national approaches, reference levels and estimates [of deforestation]." This, like many other methodological issues, will be addressed over the course of the next 2 years.

What is critical here is that the international community, as represented by the Parties to the Framework Convention, now clearly recognizes that efforts to conserve the world's tropical and subtropical forests must be part of any long-term global framework for climate change mitigation. This is due in no small part to the remarkable efforts of the Coalition for Rainforest Nations and their allies in putting this issue on the agenda. It is now clear that the developing countries that are the stewards of these tropical and subtropical forests are offering to take real and measurable action to reduce deforestation, provided that the international regime is designed to offer the right incentives for action. It is essential, therefore, that we provide these incentives, including in the United States in forthcoming climate change legislation.

With regard to specific policy instruments, the REDD Decision does not expressly endorse any particular approach and certain countries have thus far insisted that this decision be pushed to future meetings. It is also important to recognize that different countries and blocks of countries have endorsed different instruments for dealing with REDD. In our view, market-based approaches offer the most realistic opportunity for generating the scale of capital flows needed to make a significant dent in the rate of deforestation—let alone the amounts required to actually reverse the overall trends and eventually to halt deforestation altogether. And the Bali Action Plan expressly calls for considering "[v]arious approaches, including opportunities for using markets, to enhance the cost-effectiveness of, and to promote, mitigation actions." Many participants in the negotiations have noted that the term "positive incentives" is generally viewed as encompassing market mechanisms. My view is that markets must play a fundamental role in developing an effective policy for reducing emissions from deforestation.

For the reasons that I have outlined, the Parties to the Framework Convention will almost certainly include efforts to reduce emissions from deforestation in the global climate change strategy that emerges over the next couple of years. I submit to you that this will be a very good thing, for the following reasons:

First, the enormous environmental significance of preserving the world's forests, from the standpoint of the avoided carbon emissions and the protection of the Earth's climate system as well as the conservation of irreplaceable biological diversity and protection of vital ecosystem services;

Second, the importance of having—for the first time—the active participation by developing countries, such as those of the Coalition for Rainforest Nations, in the global effort to mitigate climate change;

Third, the importance of an avoided-deforestation regime as a model for other developing countries to take targets in other sectors, such as electric power or transportation, if they refuse to take Kyoto-like, economywide commitments, which many will refuse to do in the near term;

Fourth, the contribution that this will make to the willingness of the United States and other developed countries to take on ambitious targets or goals—knowing that all cost-effective alternatives are being explored and will eventually be available so long as they have environmental integrity; and

Last, but decidedly not least, the opportunities created by such an effort, if properly designed and implemented, for developing countries to forge an economic development path that is sustainable and consistent with the preservation of these vital natural assets. Significant incentives must be put in place to counter the existing pressures to cut and burn forests for agricultural expansion and other economic development.

IV. OPPORTUNITIES FOR U.S. LEADERSHIP

The U.S. has a real opportunity—in our domestic climate legislation—to lead on the deforestation issue by including provisions that recognize credits for reduced emissions from deforestation in developing countries. Such forest carbon credits would provide much-needed flexibility and cost reductions for regulated entities under a U.S. cap-and-trade system, while incentivizing developing countries to take action to reduce emissions from the forest sector.

And this does not have to wait—indeed it should not wait—until a post-2012 agreement is negotiated and in place. My view is that Congress can design legislation that allows credits for reduced emissions from deforestation and other international forest carbon activities to be traded in a U.S. cap-and-trade system in a manner that ensures environmental integrity without imposing massive transactions costs on the whole effort.

To that effect, we are encouraged by the provisions in the current version of the Lieberman-Warner bill which allocate 2.5 percent of total emissions allowances to international forest carbon activities. We would like to see that percentage increase. But we also believe that the current provision that allows regulated entities to satisfy 15 percent of their compliance obligations with allowances from foreign greenhouse gas emissions trading markets should be expanded and opened up to explicitly include credits for international forest carbon activities. And we believe that there should be provisions in the bill that incentivize developing countries to move toward national accounting frameworks for forest carbon, and that credits from countries that adopt national accounting frameworks should not be subject to quantitative limitation. These provisions would give a huge boost to the whole effort to protect and restore tropical forests in developing countries and encourage those countries to participate in a global climate protection effort. They would also allow regulated entities in the U.S. to tap into the cost-control benefits of these activities, thereby reducing the overall costs of a cap-and-trade program to the U.S. economy.

We hope, therefore, that the members of this important subcommittee will recognize the importance of incorporating reduced emissions from deforestation in U.S. cap-and-trade legislation in a manner that comports with the ongoing effort to bring deforestation into the international climate regime.

Senator MENENDEZ. Thank you, Ambassador.

Mr. Hayes.

STATEMENT OF DAVID J. HAYES, FORMER DEPUTY SECRETARY, DEPARTMENT OF THE INTERIOR; SENIOR FELLOW, WORLD WILDLIFE FUND, WASHINGTON, DC

Mr. HAYES. Thank you, Mr. Chairman, Mr. Ranking Member, and members of the subcommittee, for the opportunity to testify this morning on this incredibly important topic, international deforestation and climate change, particularly on Earth Day. I can think of no better way for all of us collectively to spend our time than to deal with this very important issue.

I am testifying this morning on behalf of the World Wildlife Fund where I am a senior fellow. In addition to my work at WWF, I have had a longstanding interest in this issue dating back to my time as Deputy Secretary of Interior in the Clinton administration.

I would like to say at the outset that WWF which, of course, has a broad mandate to protect biodiversity on this planet, is very encouraged by the promising first steps that the international community is taking with regard to global deforestation. The Bali discussions that Ambassador Eizenstat just referenced, kick off, I think, a very, very strongly promising new chapter here.

I should mention historically, as discussed in my testimony, that WWF was quite skeptical back in Kyoto days, as the Ambassador will confirm, about inclusion of forestry as part of the Kyoto compact. We think times have changed now that the industrial world is focused on reducing industrial emissions, and we must also deal with deforestation, which is, by all accounts, responsible for at least 20 percent of global greenhouse gas emissions.

We are also encouraged at WWF about the Lieberman-Warner bill and the fact that, in addition to a U.S.-based constraint on carbon emissions, it includes an international forestry title, which recognizes that the United States needs to play a leadership role in reducing emissions from deforestation and degradation abroad.

However, unlike conventional sources of greenhouse gas emissions, deforestation, and forest degradation present very difficult, multifaceted challenges that cannot be easily tackled. We think it is important to look at the root causes of deforestation and degradation if we are going to really deal with this issue comprehensively. It is going to require the cooperation of governments who are losing their forestry resources. Importantly, it is going to require the cooperation of the United States and our trading partners whose practices are influencing how forestry resources are being used and the participation of indigenous peoples and others who are most impacted by land choices made in their homelands.

As a result, we think that the international discussions and U.S. legislation should focus first on promoting economic models that will address these root causes of deforestation and degradation and which will involve the coordinated effort of the international community.

That is one reason why the discussions made this morning about Senator Lugar's work on the Tropical Forest Conservation Act are absolutely apropos. We cannot look at establishing a credit market for carbon from protected forests without looking at other tools that we can bring to the table to help protect forests and certainly the Tropical Forest Conservation Act is one.

Another, which this committee also is looking at, is amending the Lacey Act to prohibit imports into the United States of timber products comprised of illegal timber. Again, we cannot look at this issue through blinders and assume that creating a credit market that will attempt to protect forests will be enough to solve this problem without dealing with the realities that were highlighted in the New York Times on Saturday about illegal logging in many of these countries.

In that regard, I should mention that, as you know, the World Bank has reported that many tropical forested countries are losing

billions and billions of dollars from illegal logging. These are countries that typically outlaw this logging but do not have the institutional capability to deal with it.

I would like to finally—I believe my time is up—explain that we are very encouraged by the notion of using carbon markets as a key element here to deal with the deforestation efforts, but we need to put a warning sign out there. The deforestation issue presents special challenges.

First, in terms of the local capacity of developing countries to measure and monitor and validate the reductions that are needed if we are going to use these credits as though they were emissions reductions that have compliance impacts in a U.S.-based system.

And second, we have to recognize the fact, in addition to this problem of capacity, the special challenges of measurement that we are going to hear from Professor Gurney about. This is a very difficult area in which to precisely measure emissions reductions and the "leakage" issue—the problem of potentially having deforestation simply moved to another area. This is not something we can do on a project-by-project basis.

Because of these challenges, some skepticism is important, but we also think that optimism is essential. We have to solve this problem. We can solve this problem. It is going to take a concerted effort. The World Wildlife Fund and many others in the conservation community look forward to working with this committee toward that end.

Thank you very much.

[The prepared statement of Mr. Hayes follows:]

PREPARED STATEMENT OF DAVID J. HAYES, SENIOR FELLOW, WORLD WILDLIFE FUND, WASHINGTON, DC

Thank you Mr. Chairman, Mr. Ranking Member, and members of the subcommittee, for the opportunity to testify this morning on the important topic of international deforestation and climate change. I am testifying today in my capacity as a Senior Fellow at the World Wildlife Fund ("WWF"). In addition to my work with WWF, I have had a longstanding personal and professional interest in forestry issues, having served as Deputy Secretary of the Interior in the Clinton administration. Given the importance of this issue to the global environment, it is particularly fitting that the subcommittee is holding this hearing on Earth Day.

SUMMARY

WWF is encouraged by the promising first steps that the international community is taking to address global deforestation and degradation as part of the United Nations framework convention on climate change, as evidenced in the recent Conference of the Parties in Bali, Indonesia, and in discussions leading toward Copenhagen, when a new treaty is expected to be completed. WWF also is encouraged that S. 2191, America's Climate Security Act, introduced by Senators Lieberman and Warner, which would establish a U.S.-based program to constrain greenhouse gas emissions, also includes an international forestry title which recognizes that the U.S. must play an active role in "reduced emissions from deforestation and degradation" or "REDD," working in tandem with affected nations and the entire international community.

The attention on deforestation is both appropriate and necessary, given the fact that the on-going loss of forestry resources accounts for approximately 20 percent of all greenhouse gas emissions, worldwide. Simply put, we cannot make progress in battling climate change unless we reduce the alarming rate of deforestation that is occurring on an on-going basis in a number of developing nations.

Unlike conventional sources of greenhouse emissions, however, deforestation and forest degradation present multifaceted challenges that are particularly difficult to tackle. Sustainable progress will only be made by addressing the complex root causes of deforestation and forest degradation. This will require the cooperation of

the governments who are losing their forestry resources; the cooperation of the U.S. and other developed nations whose trade practices are influencing how forestry resources are being used (and/or abused); and, importantly, the active participation of indigenous people and others who are most impacted by land use choices made in their home lands.

WWF believes that international climate change discussions and U.S. legislation should focus, first, on promoting economic models that address the root causes of deforestation and degradation and which involve the coordinated effort of the international community. Economic initiatives that encourage trade in sustainable forestry resources and products, and which penalize forest degradation and the loss of valuable forest resources, for example, must be actively promoted. The development of international carbon markets that will recognize and reward the financial value of maintaining tropical forests and reducing rates of deforestation also should be the subject of active consideration. To lay the groundwork for developing such a market, a significant investment must be made in building local capacity to measure and monitor the carbon stocks in developing countries' forestry resources.

In this regard, WWF supports the Lieberman-Warner bill's establishment of an Emission Allowance Account "for use in carrying out forest carbon activities in countries other than the United States." Such an allocation would generate funding needed to help local citizens and institutions develop and proliferate the technologies and methodologies that will reliably measure and track the carbon content of forests and forest products, and to undertake the training needed to generate and validate the data used for this purpose. As discussed further below, these are essential prerequisites of any effort to establish a credible and viable carbon market in those countries.

As a corollary, WWF also supports the Lieberman-Warner bill's general expression of interest in developing and promoting a carbon market that could generate financial support for protecting forests. WWF believes that the U.S. should proceed deliberately in this area, however, in close cooperation with the international community. A carbon market that effectively generates financial incentives to reduce tropical deforestation should not be presumed to operate in the same way as today's voluntary market for carbon offsets from forests, or the Kyoto Protocol's project-based Clean Development Mechanism. A different approach will be needed if credit is to be given to avoiding deforestation and to the on-going conservation of forestry resources.

A deliberate approach also is needed due to the significant concerns that have been raised about the environmental integrity of some offset projects that have been developed under existing frameworks. Similar concerns will apply to forest-based credits. Indeed, forestry credits are likely to generate special scrutiny, given the large number of credits that potentially could be generated from avoided-deforestation projects and the special challenges of quantifying and verifying emissions reductions from improved forestry practices, particularly with regard to "leakage," "permanence" and "additionality," as discussed below. In addition, a carbon market that credits forestry-based "offsets" must not enable industrialized nations to avoid investments in their own emissions reductions.

Despite these challenges, WWF is optimistic that the U.S., working with the international community, can identify and implement a comprehensive program that tackles the root causes of deforestation. This effort can and must include the development of financial mechanisms that will sustainably protect forestry resources and complement commitments by developed countries to reduce their greenhouse gas emissions.

WWF and Forest Conservation

For more than 45 years, WWF has been protecting the future of nature. Today WWF is the largest multinational conservation organization in the world. WWF's unique way of working combines global reach with a foundation in science, involves action at every level from local to global, and ensures the delivery of innovative solutions that meet the needs of both people and nature. WWF currently sponsors conservation programs in more than 100 countries, thanks to the support of 1.2 million members in the United States and more than 5 million members worldwide.

WWF is actively engaged in the protection and sound management of forestry resources around the world. By way of example, WWF is involved in: (1) The Congo Basin Forest Partnership (CBFN), a Presidential Initiative with 34 partners worldwide, which seeks to reform forestry practices, promote economic development, and improve governance, by supporting a network of national parks, protected areas, and well-managed forestry concessions; implementing sustainable, community-based natural resource management; promoting ecotourism; helping to enforce antipoaching and forestry laws; and working with the regional Forestry Commission; (2) the

Heart of Borneo Initiative, which seeks to protect the highland forests on the island of Borneo, shared by Indonesia, Malaysia, and Brunei Darussalam, by improving transboundary cooperation, expanding the protected area network, emphasizing responsible resource use across multiple extractive industries, such as pulp and paper and palm oil production, and developing long-term sustainable and equitable financing mechanisms; and (3) the Amazon Initiative, which includes work through the Amazon Region Protected Areas Program (ARPA), and the Amazon Headwaters Program, as well as efforts to engage major corporations in Europe and the U.S. to build commitments to purchase of sustainably managed wood from this region.

Transcending our work in specific regions such as the Congo Basin, Borneo, or the Amazon, WWF also works directly with global forestry markets. WWF is a partner in the Global Forest and Trade Network (GFTN), supported by the Sustainable Forest Products Global Alliance (Global Alliance)—a U.S. AID—funded public/private partnership that catalyzes businesses, public agencies, and nongovernmental organizations to promote responsible management of forest resources, reduce illegal logging and improve the well-being of local communities. The GFTN seeks to provide committed companies with tools and technical assistance to achieve responsible forestry through their management and purchasing practices. It has established regional Forest Trade Networks in key producer and consumer countries and regions covering over 30 countries, with a total of 361 separate legal entities around the world. GFTN Participants and Applicants produce or trade in an estimated volume of 222 million cubic meters of round wood equivalent, representing 12.3 percent of the global total traded, estimated at 1.799 billion cubic meters in 2005 by FAO. In terms of value, GFTN Participants and Applicants produce or trade in an estimated $49 billion or approximately 13.6 percent of the global total ($360 billion estimated by WRI). In addition, GFTN Participants and Applicants employ over 150,000 people, or approximately 1.2 percent of the global total based on the FAO estimate (in 2000) of 12.9 million forest workers globally.

Through its work, WWF has come to understand the complex factors that play a key role in maintaining healthy forests. WWF works on different aspects of forestry management—governance, trade, logging, conversion, finance, supply chain, etc.—giving us a unique holistic view of how to address forestry management in the context of carbon management.

Tropical Deforestation and Its Impact on the Global Carbon Cycle

Forests play a key role in the global carbon cycle, and they must play a central role in efforts to slow and eventually halt human contributions to climate change. Forty to sixty percent of the world's land-based carbon is stored in forest reservoirs, and these natural resources provide a critically important line of defense against carbon emissions. Just when we need the world's forests the most—to remove as much carbon dioxide from the atmosphere as they possibly can—our forests are disappearing. Over the last 8,000 years, the world has lost about half of its forest cover:[1] the current rate of forest destruction is estimated to be 32 million acres each year.[2] In the next 24 hours, deforestation at rates of about 100 acres a minute will release as much CO_2 into the atmosphere as would 8 million people flying from London to New York.[3] In recent years, forestry-sourced emissions have accounted for about 20 percent of total global emissions.[4] The Intergovernmental Panel on Climate Change (IPCC) estimates that land use change emissions, mostly from tropical deforestation, released between 800 million and 2.4 billion metric tons of carbon per year during the 1990s, and currently releases an estimated 1,700 million tons per year.[5] In the past, these emissions represented anywhere from 10–25 percent of all global human-induced emissions.[6]

When we lose our forests, the global environment takes a double hit. First, the carbon that was being stored in forests is vented to the atmosphere, adding to the

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[1] Submission by the Governments of Papua New Guinea & Costa Rica, "Reducing Emissions From Deforestation in Developing Countries: Approaches to Stimulate Action," COP 11; available at http://www.rainforestcoalition.org/documents/COP-11AgendaItem6-Misc.Doc.FINAL.pdf.

[2] Bryan Walsh, "Getting Credit for Saving Trees," Time Magazine; available at: http://www.time.com/time/magazine/article/0,9171,1642887,00.html.

[3] Cool Earth Action, http://www.coolearth.org.

[4] Blue Climate, "Expand Kyoto Clean Development Mechanism to Include Deforestation?"; available at :http://www.blueclimate.com/blueclimate/2006/11/expand__kyoto__cl.html.

[5] Center for International Forestry Research, "Reducing Emissions from Deforestation"; available at: http://www.cifor.cgiar.org/carbofor/highlights/reduce-emission.htm.

[6] Submission by the Governments of Papua New Guinea and Costa Rica, "Reducing Emissions From Deforestation in Developing Countries: Approaches to Stimulate Action," COP 11; available at http://www.rainforestcoalition.org/documents/COP-11AgendaItem6-Misc.Doc.FINAL.pdf; "IPCC Special Report on Land Use, Land Use Change and Forestry"; available at: http://www.grida.no/climate/ipcc/land__use/index.htm.

man-induced increases in carbon emissions that are causing climate change. This makes emissions from deforestation and other land use changes comparable to global emissions from petroleum, coal, or natural gas,[7] and almost equal to all U.S. emissions.[8] Emissions from deforestation in Brazil and Indonesia alone are equal to the entire reduction commitments of the Annex 1 countries of Kyoto Protocol during the Protocol's first commitment period.[9]

Second, in addition to directly burdening the atmosphere with large volumes of new carbon emissions, deforestation impairs or destroys many of the goods and services that forests provide to both the environment and to people. The Natural Capital Project, a joint project sponsored by WWF, the Nature Conservancy and Stanford University's Woods Institute for the Environment, has identified and is quantifying many of these services, including protection of water supplies, the generation of a wide variety of forest-related products, and the promotion of recreation and tourism and cultural and aesthetic values.[10]

Reduced Emissions From Deforestation and Degradation Should and Will Be Addressed as Part of the International Framework Convention on Climate Change

Although forests play a central role in the carbon cycle, forestry issues have played a limited role to date under the Kyoto Protocol. There are sound, historical reasons why forestry is not a primary focus of the existing Protocol. Specifically, in the leadup to the Kyoto agreement, a number of countries, including the United States, were arguing that the absorptive capacity of their carbon "sinks" should reduce their obligations to mitigate emissions from other sources. WWF objected to countries relying on existing forestry resources as a means of avoiding having to reduce emissions from industrial sources, and WWF played a significant role in limiting the role of forestry and land use in establishing baselines under the Kyoto Protocol and in meeting carbon emissions reductions required under the Protocol.

But the times and circumstances have changed and, WWF strongly believes that forestry issues—particularly tropical deforestation and degradation—must now be incorporated into the international framework on climate change. The debate on forestry has moved from a discussion revolving around the tactical use of forests to define emissions reductions obligations to a recognition that deforestation is a major source of carbon emissions that must be reduced in the first instance. The science on this issue also has advanced significantly in the years since Kyoto. Remote sensing technology and other scientific tools enable us to better understand and calibrate the impact of the deforestation and degradation that is occurring around the world. Finally, unlike the Kyoto negotiations, developing countries are now engaged in this issue and are asking that forestry resources be incorporated into the international climate framework. As you know, the Coalition for Rainforest Nations and other developing world nations have advanced serious proposals which prompted the international community, in the recent Bali discussions, to launch a new initiative to integrate forestry issues into the international framework convention on climate change.

Special Challenges Associated With Effectively Reducing the Rate of Tropical Deforestation and Degradation

Although a consensus is emerging that tropical deforestation issues must be addressed as a part of the international framework convention on climate change, there are special challenges in designing an initiative that will avoid tropical deforestation and in folding such a plan into an international agreement and/or into domestic legislation.

First, the causes of deforestation and the degradation of forests in developing countries are complex, and are not easily addressed through financial transfers or short-term conservation efforts. The problems of deforestation and forest degradation can only be effectively addressed by acknowledging and systematically confronting their underlying causes. The economic pressures to clear forests in some developing countries are enormous. The short-term gains from overharvesting can be irresistible, particularly when the economic advantages of conducting sustainable

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[7] Submission by the Governments of Papua New Guinea and Costa Rica, "Reducing Emissions From Deforestation in Developing Countries: Approaches to Stimulate Action," COP 11; available at http://www.rainforestcoalition.org/documents/COP-11AgendaItem6-Misc.Doc.FINAL.pdf; "IPCC Special Report on Land Use, Land Use Change and Forestry"; available at: http://www.grida.no/climate/ipcc/land__use/index.htm.

[8] Katherine Ellison, "Shopping for Carbon Credits," Salon.com; available at: http://www.salon.com/news/feature/2007/07/02/carbon__credits/index__np.html.

[9] Center for International Forestry Research, "Reducing Emissions from Deforestation"; available at: http://www.cifor.cgiar.org/carbofor/highlights/reduce-emission.htm.

[10] See, e.g., http://naturalcapitalproject.org/toolbox.html#Life.

forestry practices and the marketing of forestry products may not be appreciated or, in some cases, may not be feasible. Indigenous and forest-dependent people have an enormous stake in these issues, and strategies to protect forests cannot go forward without the full participation of the people who live and work in forested areas. Indeed, the only forest protection strategy that is likely to have long-term success is a strategy that acknowledges the economic drivers at work and which promotes the introduction of sustainable forestry practices on a global basis—work that WWF has been pioneering for many years.[11]

Second, while the science has improved, there remain serious technical and methodological issues associated with monitoring and measuring emissions from forestry resources. Measuring carbon stocks in forestry resources is a complex undertaking. It is not amenable to the same type of precision that can be achieved when documenting emissions from point sources.[12] Also, forests raise special challenges regarding the "permanence" of carbon sequestration, given the dynamic nature of forests, including different rates of tree growth and death, periodic fires, etc. "Leakage" also is a special concern that poses perhaps the most significant challenge in the forestry sector. If deforestation is avoided in one area due, for example, to a project-based investment in maintaining a particular forest, there may be a risk that deforestation will simply occur in another, unprotected area. Finally, the concept of avoided-deforestation—which is based on the need to protect existing forestry resources—does not comport with the usual test for demonstrating progress in reducing emissions—the "additionality" test which customarily measures "additional" reductions that would not otherwise have occurred against a preexisting baseline.[13]

WWF does not believe that any of these technical and methodological issues are insurmountable. National baselines for deforestation rates, for example, provide a promising means to address leakage and permanence. Nonetheless, all of these issues present difficult challenges in the forestry context; they must not be brushed aside. It will take a large, well-organized, and concerted effort on these technical issues to earn the credibility that must underpin major investments in protecting the world's forests.

Third, as a related point, there is limited institutional capacity in many developing countries to apply the type of new technologies and methodologies that are needed to track and calibrate progress in limiting deforestation and degradation. There is an enormous gap between what is theoretically possible and on-the-ground capabilities in many of the concerned nations, which are grappling with severe economic and social challenges on many fronts.

The combination of these special challenges means that the traditional approach for reducing greenhouse gas emissions is not easily and readily applied in the tropical deforestation context. When seeking to reduce emissions from other types of sources, financial capital is typically invested in specific projects that generate measurable and verifiable reductions in greenhouse gas emissions that otherwise would not have occurred. These demonstrated reductions are then traded on the carbon markets that have emerged under the Kyoto scheme, and through the voluntary marketplace.

As explained above, concerns about measurement error, leakage, additionality and permanence on a project-by-project basis can be acute in the forestry context. Moreover, the typical notion of rewarding efforts to reduce emissions that would otherwise occur does not fit with the compelling need to maintain the status quo in terms of protecting tropical forests that are threatened by conversion to agriculture or other land uses. We must find ways for tropical forested countries that have current low rates of deforestation and forests that engage in sustainable forest management practices to participate in future carbon markets. In addition to these forestry-specific challenges, the broader questions about the environmental integrity of "offset" schemes, and their relationship with other emissions reductions commitments, must be squarely confronted and addressed.[14]

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[11] See generally, the Center for International Forestry Research Web site, http://www.cifor.cgiar.org/Research/ENV/Themes/SUF.

[12] See, e.g., Zach Willey and Bill Chameides (ed.), "Harnessing Farms and Forests in the Low-Carbon Economy: How to Create, Measure, and Verify Greenhouse Gas Offsets" (Duke University Press 2007).

[13] See generally, Mark Trexler, Derik Broekhoff and Laura Kosloff, "A Statistically-Driven Approach to Offset-Based GHG Additionality Determinations: What Can We Learn?" Sustainable Development Law and Policy (Winter 2006).

[14] See generally, David J. Hayes, "Getting Credit for Going Green: Making Sense of Carbon 'Offsets' In a Carbon Constrained World," Center for American Progress (March 2008). See also WWF analysis of the operation of the CDM mechanism, http://assets.panda.org/downloads/cdm__report__wwf__background__paper.pdf.

For all of these reasons, WWF believes that it is not appropriate to simply assume that the model of investing in carbon reduction projects, as implemented through the Clean Development Mechanism under the Kyoto Protocol and other "offset" models, can or should be applied in the international forestry context. WWF will be an active participant in the international discussions following Bali, in which alternative approaches will be discussed for how best to bring forestry, and the deforestation and degradation issue in particular, into the international climate framework. Concurrently, WWF will be developing a portfolio of pilot projects within tropical forested countries with current high rates of deforestation that will address capacity building and the technical and methodological needs that have been discussed in this testimony.

RECOMMENDATIONS

Multilateral Negotiations

Although the discussions on this subject remain in their early stages in the international arena, a few observations that may be helpful to this committee's consideration of this issue are in order—particularly with regard to U.S. engagement on the tropical deforestation problem.

First, the United States must be actively involved in post-Bali efforts to address the tropical deforestation issue. Good ideas are being put on the table. The Tropical Rainforest Coalition, for example, has asked for the assistance of developed nations to "support [forest protection efforts] through capacity-building, research and development, [and the] transfer of appropriate environmentally sound technologies." The coalition also has expressed an openness to consider a variety of alternative financing mechanisms to address the deforestation issue.

A number of proposals are being floated, including the Environmental Defense Fund's notion of "compensated reduction" under which tropical countries would receive emissions allowances tradable in the global carbon market based on a showing of "real reductions" that have been proven to have taken place. EDF's proposed focus is on "a nation's entire forest system, not just individual projects, thereby avoiding problems that have hindered consensus on forest issues."

Also, some NGOs have suggested that the U.N. adopt a "dual markets approach" under which a separate carbon market would be created in which developed countries could invest in reducing deforestation in developing countries in order to achieve a portion of their national Annex I post-2012 carbon reduction targets.

Creating a dual market would address the concern that avoided-deforestation credits could be given out too generously and without adequate safeguards, thereby potentially disrupting the more carefully constrained carbon market.[15]

Other proposals focus on the creation of a global avoided-deforestation fund or funds, financed by governments and/or the private market, which would be applied toward avoided-deforestation and sustainable forestry initiatives, including capacity building and the development of a technical information needed to assess progress.

The United States should be an active participant in the international discussions addressing all of these approaches.

U.S. Legislative Proposals Addressing Forestry and Climate

Capacity-building; Technical and methodological support

As noted above, WWF supports the Lieberman-Warner bill's establishment of an Emission Allowance Account "for use in carrying out forest carbon activities in countries other than the United States." This allocation can generate some of the funding that is needed to address the technical and methodological gaps, and the institutional limitations, discussed above. Such funding should be coordinated with the work of other governments and NGOs who are actively engaged in addressing these issues.

In addition to the proposed Lieberman-Warner funding mechanism, WWF urges this subcommittee to consider providing foreign assistance funding from other programs that are under its jurisdiction (including USAID program assistance, for example) to address urgent needs presented by global deforestation. Many agencies of the United States Government are involved in trade and development issues that directly or indirectly affect tropical deforestation. WWF urges the subcommittee to request the administration to identify and coordinate these activities, so that the

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[15] See, e.g., Center for Clean Air Policy, "Reducing Emissions from Deforestation and Degradation: The Dual Markets Approach" (August 2007), http://www.ccap.org/international/FINAL%20REDD%20report.pdf. See also, Greenpeace, "Tropical Deforestation Emission Reduction Mechanism: A Discussion Paper" (December 2007), http://www.greenpeace.org.uk/files/pdfs/forests/tderm-funding-mechanism.pdf.

U.S. can maximize its efforts to reduce the massive greenhouse gas emissions that are being caused by deforestation.

Application of carbon markets and other financial incentives to forestry resources

As discussed above, WWF also believes that there is an important role for the carbon market to play in addressing this issue. For the reasons discussed above, however, it is important not to prejudge the nature and scope of that involvement. Neither the U.S. nor any other developed nation should presume what type of approach will be acceptable and/or desirable from the perspective of the developing nations that are facing the on-going challenge of deforestation and forest degradation.

In that regard, the Lieberman-Warner international forestry title's indication that EPA should "recognize credits from forest carbon activities," while also encouraging EPA "to identify other incentives, including economic and market-based incentives, to encourage developing countries with largely intact native forests to protect those forests" leans in an appropriate direction. The legislation, however, would benefit from more explicit instructions to EPA to develop options for crediting forest protection activities in coordination with post-Bali discussions that are occurring on an international level. EPA should be directed to work with interested parties, including scientists, industry representatives, NGOs, and others, to identify and/or develop workable technical and methodological approaches for measuring carbon stocks in various types of forests, and in defining and accounting for carbon impacts associated with engaging in sustainable forestry practices in tropical forests. Guidance also should be developed for addressing the permanence, leakage additionality issues discussed above.

Other policy initiatives to address international deforestation and climate change

While much of the discussion on forestry and climate change currently taking place among policymakers centers on a post-Kyoto multilateral framework and specific U.S. cap-and-trade legislation such as S. 2191, it is important to recognize the multitude of other efforts taking place to address forestry conservation, and their role in addressing climate change.

Legislatively, for example, Congress can and should reauthorize the Tropical Forest Conservation Act, which provides for debt-for-nature swaps for certain countries and eligible debt, and which is under the jurisdiction of the Foreign Relations Committee. This program can play an important role in forest conservation as it relates to climate change through the development of a debt-for-carbon program for forestry conservation. Congress also is considering amendments to the Lacey Act to prohibit imports into the U.S. of timber products comprised of illegal timber. Prohibitions like this, which address the demand side, provide an implement complement to conservation efforts that focus on supply side. Likewise, a number of Free Trade Agreements with developing countries rich with tropical forests—including Peru, Columbia, and Malaysia—may soon come before the Senate. How forestry conservation and technology are handled in those FTAs may have a strong bearing on forestry conservation in the context of climate change.

The U.S. also can take additional steps administratively to promote forestry conservation practices. The U.S. recently entered into a bilateral agreement with Indonesia on forestry conservation, and is currently negotiating a Memorandum of Understanding with China, through the Strategic Economic Dialogue, on timber trade. These agreements can create important opportunities for collaboration to address deforestation and forest degradation. USAID also can and should explore its financial assistance framework and funding priorities in the context of climate change. Much of its biodiversity work ($195 million in FY 2009) focuses on forestry conservation. These activities should be evaluated with an eye toward mitigating greenhouse gas emissions, and adapting to a changing climate.[16] In sum, WWF encourages this subcommittee to utilize its full jurisdiction in exploring ways to address deforestation and climate change.

CONCLUSION

WWF thanks the subcommittee for holding a hearing on the critically important topic of reducing emissions from deforestation and degradation, and for inviting WWF to testify on the subject. WWF looks forward to continuing to work with the

[16] In August 2007, USAID published "Adapting to Climate Variability and Change: A Guidance Manual for Development Planning," which also can be used in considering how best to fund forestry conservation projects for climate change.

subcommittee, and with the full Committee on Foreign Relations, on this vitally set of important issues.

Senator MENENDEZ. Thank you, Mr. Hayes.

Dr. Gurney.

STATEMENT OF DR. KEVIN GURNEY, ASSOCIATE DIRECTOR, PURDUE CLIMATE CHANGE RESEARCH CENTER (PCCRC), PURDUE UNIVERSITY, WEST LAFAYETTE, IN

Dr. GURNEY. I would like to thank Senator Menendez and other members of the Senate subcommittee for inviting me here today to testify on matters of deforestation and climate change within the context of U.S. domestic policy and the international policy regime. I particularly thank Senator Lugar for his opening statement and including the Vulcan Project in his comments. It was an unexpected but pleasant surprise.

The topic of deforestation within the broader umbrella of climate change policy intersects in complex ways with a number of scientific disciplines, including climate science, biogeochemistry, and ecological sciences. My written submission and comments today are an attempt to clarify some of these key intersections and, in doing so, assist the policy process as it considers deforestation as an element in greenhouse gas mitigation strategies.

Deforestation is one of many carbon fluxes or transfers between the earth's surface and the atmosphere. After accounting for fossil fuel incident production emissions of CO_2 into the atmosphere and taking into account the now well-quantified removal of CO_2 from atmosphere by the oceans, the net exchange with the land-based biosphere remains a poorly understood portion of the overall budget. When satellite remote sensing is combined with ground-based observations and biosphere models, it is estimated that land use change, currently dominated by tropical deforestation, emits an amount of CO_2 equivalent to one-quarter of that emitted by fossil fuel sources alone. This estimate, however, is not well quantified. It varies by almost 69 percent.

Furthermore, in order to complete the atmospheric budget, the total of which is well constrained by precise atmospheric measurements, a large removal process must be at work. This removal process, which you can think of as sequestration or uptake, is understood to be occurring in the land-based biosphere and is removing almost one-third of the combined fossil and deforestation emissions. Originally referred to as the missing sink, which is a play on the phrase "the missing link," this removal is now generally referred to as the residual flux.

The reason I bring up this seemingly arcane piece of biogeochemistry is that this uptake is at work in many places, even in intact, mature tropical forests, the same forest regions that are under threat from deforestation.

From the atmosphere's point of view, which is the point of view central to climate change, the total net flux emerging from tropical forests, which is the sum of deforestation and atmospheric removals, is what climate science ultimately must know. The distinction between these two fluxes is, therefore, somewhat misleading in that the estimated magnitude of one—deforestation, for example—is actually dependent upon the estimated magnitude of the other.

From the ecological perspective, however, the distinction between deforestation and residual flux uptake is crucial, as deforestation is distinct in its implications for biodiversity, regional climate, regional hydrology, and habitat. Tropical deforestation has emerged within the climate change policy discussions for a number of reinforcing reasons. It is a significant component of the overall net land-atmospheric flux and it is often the dominant source of greenhouse gas emissions for many tropical developing countries. For example, 84 percent of Indonesian greenhouse gas emissions in 2000 were due to deforestation. For Brazil, this number was 62 percent; for Malaysia, 81 percent. In terms of strict mitigation considerations, the deforestation flux is the first point of consideration for these and many other tropical countries.

Deforestation has gained added momentum within the international negotiations due to the importance this topic holds for many other stakeholder communities such as those focused on biodiversity, cultural concerns, and socioeconomic interests. A number of proposals have been put forth on how to structure deforestation emission reduction targets within the international regime, and pending domestic legislation reflects this structure, for example, Senate bill 2191. Many suggest a baseline against which progress can be measured, recognize the need to create incentives for deforestation reductions, and have varying degrees of financial reward for selling credits accrued through deforestation rate reductions.

The most obvious scientific question that emerges as these policy options are considered is the ability to accurately measure and monitor deforestation fluxes. Attempts have been made to quantify the level of uncertainty associated with deforestation carbon emissions. At the regional scale, such as for the Brazilian Amazon, these estimates are conservatively estimated to be on the order of 50 percent. Attempts to project what these uncertainties may be in a few years suggest a lowering to 16 percent. However, there are key caveats to these values and these caveats could, indeed, increase the present and future values of uncertainty in significant ways.

It is important to note that the satellite measurement component of these uncertainties is typically the most accurate. Biomass estimation, forest structure, and other ground-based elements are the most uncertain and the most difficult to improve.

The measurement difficulty emerges again when considering the establishment of baselines to measure deforestation progress because historical data is less comprehensive and accurate and current measurements establishing historical baselines is potentially error-prone. A series of additional difficulties emerge such as the considerable variations in deforestation fluxes from year to year, some initiated by processes beyond human control, the difficulties associated with additionality, the continuing concern over leakage, the recognition of forest degradation as a significant contributor to the total deforestation flux, and the challenges of verifying reported fluxes using independent techniques.

These difficulties should not be construed as either insurmountable or a reason to delay consideration of policy options for crediting deforestation reductions. It is merely to establish what the current capabilities and knowledge are on this topic so that pru-

dent policy choices can be made and policies structured with designed flexibility to progress as scientific knowledge improves.

Whether or not current scientific knowledge is sufficient to support the current policy goals under discussion rests to a great degree on the implicit policy priorities. If the net radiative forcing of deforestation emission reduction is paramount, the current science on the net impact of deforestation on the atmosphere may be too limited and too uncertain to adequately support the aims of current proposals. If primacy is placed on tropical forest preservation, the potential cobenefit of lowered greenhouse gas emissions may not require a high level of scientific certainty and emphasis should be placed on those aspects that assess the phenomenon of deforestation with perhaps less emphasis on the net associated greenhouse gas emissions.

Thank you very much, Mr. Chairman. That concludes my verbal testimony to this subcommittee.

[The prepared statement of Dr. Gurney follows:]

PREPARED STATEMENT OF DR. KEVIN ROBERT GURNEY, ASSOCIATE DIRECTOR, PURDUE CLIMATE CHANGE RESEARCH CENTER (PCCRC), PURDUE UNIVERSITY, WEST LAFAYETTE, IN

This statement presents an overview of tropical deforestation within global carbon cycle science and how this science intersects with current and future policy. It begins by setting the large-scale features of carbon exchange followed by a more specific treatment of tropical deforestation. This scientific understanding is then placed within the context of current international policy discussions on deforestation reduction credits and potential U.S. policy with similar aims. I will review the relevant scientific knowledge in support of the proposed policy goals, highlighting uncertainties and scientific challenges.

THE CONTEXT

The Global Carbon Cycle

The current budget of carbon dioxide (CO_2) within the Earth's atmosphere continues to present challenges to quantification, particularly the portion that involves exchange between the terrestrial biosphere and the atmosphere. Table 1 presents the Intergovernmental Panel on Climate Change's (IPCC) recent review of the global carbon budget for the decade of the 1990s.[1,2] The most precise budget element is the increase in atmospheric carbon. This increase amounts to 3.2 billion tonnes of carbon each year or 3.2 "GtC/y."[3] The emission of fossil fuel-derived carbon and that due to cement production is also relatively well-known at 6.4 GtC/y. Recent research into ocean exchange has improved that portion of the budget (an uptake of −2.2 GtC/y), leaving a final term in the budget: The net land-atmosphere exchange which amounts to global net uptake of −1.0 GtC/y. You will note that the confidence regarding the magnitude of these large net fluxes around the planet increases, with the last term having an uncertainty of over 50 percent (a one sigma uncertainty).

TABLE 1.—IPCC REVIEW OF THE GLOBAL CARBON BUDGET IN UNITS OF GtC/YEAR WITH ONE SIGMA UNCERTAINTY ESTIMATES

	1980s		1990s		2000–2005 AR4
	TAR	TAR revised	TAR	AR4	
Atmospheric increase	3.3 ± 0.1	3.3 ± 0.1	3.2 ± 0.1	3.2 ± 0.1	4.1 ± 0.1
Emissions (fossil+cement) ...	5.4 ± 0.3	5.4 ± 0.3	6.4 ± 0.4	6.4 ± 0.4	7.2 ± 0.3
Net ocean-to-atmosphere flux	−1.9 ± 0.6	−1.8 ± 0.8	−1.7 ± 0.5	−2.2 ± 0.4	−2.2 ± 0.5
Net land-to-atmosphere flux	−0.2 ± 0.7	−0.3 ± 0.9	−1.4 ± 0.7	−1.0 ± 0.6	−0.9 ± 0.6
Partitioned as follows:					
Land use change flux	1.7 (0.6 to 2.5)	1.4 (0.4 to 2.3)	n.a.	1.6 (0.5 to 2.7)	n.a.

TABLE 1.—IPCC REVIEW OF THE GLOBAL CARBON BUDGET IN UNITS OF GtC/YEAR WITH ONE SIGMA UNCERTAINTY ESTIMATES—Continued

	1980s		1990s		2000–2005 AR4
	TAR	TAR revised	TAR	AR4	
Residual terrestrial sink ...	−1.9 (−3.8 to −0.3)	−1.7 (−3.4 to 0.2)	n.a.	−2.6 (−4.3 to −0.9)	n.a.

It is this last term, the net exchange between the global terrestrial biosphere and the atmosphere, that is of particular relevance to tropical deforestation, climate change and policies aimed at their amelioration.

The net land-atmosphere exchange is commonly defined as having two very important parts:

(1) The "land-use change" flux, and
(2) The "residual" flux.

The first is an amount of carbon emission that is associated with readily observable phenomena at the surface and is nearly synonymous (in modern times) with tropical deforestation. This emission has an estimated magnitude for the 1990s of 1.6 GtC/y but with a large, uncertain range (0.5 to 2.7 GtC/y). This value is at the core of the oft-cited comment that tropical deforestation accounts for approximately 20 percent of global carbon emissions. However, it is worth noting that this is a poorly known quantity and more correctly ranges from 6 percent to 32 percent of global emissions.

The residual flux, as it's name implies, is the uptake necessary to balance the well-constrained total budget. It is a phenomenon of considerable scientific research and profound importance to climate change and climate change policy.[4] It is a very uncertain flux ranging from −4.3 to −0.9 GtC/y and it's magnitude is directly tied to the estimated magnitude of tropical deforestation. Were the estimated tropical deforestation to increase, the residual uptake would also increase (a larger net uptake value) in order to maintain the same total global budget.

A series of hypotheses have been posited to explain this residual flux and include a combination of CO_2 fertilization, nitrogen fertilization, climate variability/change, and human management with the mixture differing from place to place. It must be remembered that all net terrestrial biosphere fluxes are the balance of very large gross fluxes of over 100 GtC/y, due to the seasonal "give and take" of photosynthesis and respiration. Hence, isolating this residual flux is akin to searching for a "needle in the haystack."

The separation of the net land-atmosphere exchange (into parts (1) and (2) above) is, in some ways, an intellectual convenience. Many of the processes in (2) above are thought to occur simultaneously with those in (1). For example, there is research that suggests net carbon uptake is occurring in mature, intact tropical forests. The implication is that countries with large tropical forests may have both deforestation and net uptake (CO_2 fertilization, N fertilization, etc.) occurring within national boundaries.

This distinction goes beyond simple academic curiosity. The atmosphere "sees" the total net flux—this is what drives the additional greenhouse gas forcing due to this large component of the atmospheric carbon budget. A portion of climate change forcing is due to deforestation. However, it appears that there are countervailing processes ameliorating the full carbon impact of the deforestation emissions.

In addition to carbon emissions from tropical deforestation and the resulting addition to atmospheric CO_2, tropical forests have a number of key interactions with the climate system that are poorly understood but recognized as being important at the large scale. For example, tropical forests act as crucial mediators of radiation transfer and water exchange between the tropical land regions and the atmosphere. Recent research has shown that large-scale deforestation/afforestation can have a cooling/warming influence of measurable magnitude relative to projected climate change.[5] Furthermore, the impact of afforestation in the tropics is one of cooling while high latitude afforestation exacerbates climate warming.

There is also research that indicates potential feedbacks between climate and forest function.[6] For example, changes in forest cover could cause changes in local climate, particularly drying and warming resulting in a shift toward savannah or grassland ecosystems. This shift would transfer potentially large amounts of carbon to the atmosphere and act as a positive feedback between climate change and tropical forest integrity.

It is important to keep in mind that this is a view of tropical forests that is necessarily from the climate science perspective. Tropical forests have additional importance when viewed from ecological, social, and economic perspectives. Policy options may include these other perspectives.

Tropical Deforestation

The current estimates for tropical deforestation at the regional scale are arrived at through a variety of techniques such as satellite remote sensing, ground surveys, aircraft, flux towers, model estimation and inverse approaches. Many of these are used in combination, with each having particular strengths and weaknesses. When ordered by their carbon emissions magnitude (for the decade of the 1990s), the IPCC estimates the large tropical regions as follows:

Tropical Asia: 0.8 GtC/y (0.4 to 1.1)
Tropical America: 0.7 GtC/y (0.4 to 0.9)
Tropical Africa: 0.3 GtC/y (0.2 to 0.4)

When viewed next to the decade of the 1980s, all regions have exhibited increases in total deforestation carbon emission, though uncertainty is large. When examined as a year-to-year phenomenon, large-scale deforestation emissions exhibit considerable variability. For example, the Brazilian space agency has estimated the year-to-year variations in deforestation emissions to be as high as 30 percent.[7]

At the individual country-level, the importance of deforestation as a share of total national emissions varies substantially among tropical countries. Table 2 lists many of the top greenhouse gas (GHG) emitting countries with the land-use, land-use change share quantified separately. Tropical countries are shown in italic.

TABLE 2.—RANKED GHG EMISSIONS FOR THE YEAR 2000 WITH THE LULUCF COMPONENT ISOLATED [8]

	LULUCF (MtC eq) [α]	LULUCF (MtC eq) [β]	Percent LULUCF
USA	1779.7	−110.0	6
China	1336	−12.9	1
EU (25)	1280.8	−5.7	0.4
Indonesia	*834.5*	*699.5*	*84*
Brazil	*604.4*	*374.5*	*62*
Russia	538.4	14.7	3
India	*490.5*	*−11.0*	*2.2*
Japan	365.1	1.2	0.3
Malaysia	*237*	*190.8*	*81*
Canada	201.9	17.6	9
Mexico	*165.8*	*26.4*	*16*
South Korea	143.7	0.4	0.3
Ukraine [χ]	141	0.0	0.0
Myanmar	*138.6*	*116.1*	*84*
Australia	135.3	1.2	0.9
Iran	122	2.3	1.9
South Africa	*113.1*	*0.5*	*0.4*
Venezuela	*104*	*39.3*	*38*
Turkey	102.8	5.7	5.5
Dem. Rep Congo	*100.7*	*86.6*	*86*
Zambia	*69.1*	*64.3*	*93*

[α] "MtC eq"—million metric tons of carbon equivalent.
[β] Negative numbers indicate net uptake.
[χ] No CH_4 or N_2O.

The majority of the tropical countries have deforestation (which is nearly identical to LULUCF in these countries) as the dominant source of overall greenhouse gas emissions to the atmosphere. These numerical facts indicate why tropical deforestation has emerged as a top priority within the climate policy regime: Deforestation is large in the absolute global sense and it is often the dominant form of greenhouse gas emissions for many developing countries.

Current Policy Consideration

The current emphasis within the international climate change policy realm is on constructing a post-2012 commitment structure in which all countries, including those in the developing world, would enter into some form of emission mitigation agreement. Because of the preceding analysis, the renewed interest in incorporating

the developing world in future agreements, and the many dimensions of tropical forests, tropical deforestation has figured prominently in this discussion and is now taking a central role in international negotiations. Furthermore, because of lengthy discussion of deforestation in the negotiations around the first commitment period of the Kyoto Protocol, there is broad interest in structuring deforestation mitigation targets at the national level as opposed to the project or plot-scale.[9]

A number of proposals have been put forth on how to structure deforestation emission reduction targets. All of these proposals, with one exception (to be discussed later), require determining some form of baseline for deforestation against which a target can be compared. These baselines can be constructed as historical averages or as projections into the future along a "business as usual" trajectory. Therefore, effort at reducing deforestation, below either the historical or projected baselines, constitute legitimate reduction effort.

Many of the proposals also recognize the need to create incentives for deforestation reductions and have varying degrees of financial reward for selling credits when countries exceed certain mitigation thresholds. The supply of financing for these reductions are expected to come under a trading regime in which countries that face high mitigation costs purchase lower cost deforestation credits and thereby meet emission reduction goals.

Similarly, Senate bill 2191 (America's Climate Security Act of 2007), proposes mechanisms whereby the United States would allow a certain percentage of domestic mitigation to be met by "carrying out forest carbon activities in countries other than the United States."

Both the international proposals and S. 2191 intersect in critical ways with the current scientific knowledge on deforestation and the carbon cycle.

CRITICAL SCIENTIFIC ISSUES

Measurement Uncertainties

A recent study attempted a review of deforestation uncertainties when combining a cluster of measurement techniques at the national level.[10] The authors conclude that current quantification of deforestation credits at scales approaching the national level (the estimate was prepared for the Brazilian Amazon), to be almost 50 percent (2 sigma interval). This uncertainty accounted for current satellite capabilities, above-ground biomass, dead biomass, and below-ground biomass estimation. The authors note that though seemingly large, this level of uncertainty is not fundamentally different from those recognized for the non-CO_2 greenhouse gases, methane, and nitrous oxide, within current Annex I accounting.

It is also important to note that this estimate does not explicitly include the difficulties associated with forest degradation and the spatial variability of biomass. Forest degradation is the loss of biomass and carbon within a forest system while still maintaining a sufficient forest canopy such that an area does not fall into a deforested category. Degradation is notoriously difficult to measure remotely and is estimated to constitute, for example, 2–25 percent of deforestation in the Brazilian Amazon. The variability of biomass is also a poorly quantified component of tropical forest inventories and similarly could increase this uncertainty should variation occur at the regional scale.

The same study attempted to estimate future improvements in this uncertainty estimate and came to the conclusion that expected improvements in remote sensing and an anticipated halving of uncertainty in ground-level survey data would bring this uncertainty down to 16 percent. Once again, however, degradation and the spatial variability of biomass could potentially increase this uncertainty depending upon how much degradation occurs.

Baselines

Many of the current international proposals under consideration in addition to S. 2191, borrow the precedent established in the first commitment period of the Kyoto Protocol for industrial emissions: Recommending deforestation reductions relative to a historical baseline. Some proposals suggest that deforestation mitigation be measured against a projected business as usual trajectory. From a scientific perspective, the biggest challenge is the establishment of a historical level of deforestation emissions given the fact that data availability and quality decreases as one moves back through the decade of the nineties and the eighties. The uncertainty associated with establishing a historical baseline can have implications for the functioning of an international trading regime. Should a baseline be set at a level mistakenly higher than actual deforestation levels, deforestation levels could potentially increase while at the same time offering up undeserved credits and leading to a net increase in

atmospheric CO_2. Should a level be set lower than actual deforestation, developing countries could find themselves having to purchase credits to cover their shortfall.

Isolating Deforestation or Not?

Many of the techniques used to assess tropical deforestation are better suited, or result in less uncertainty, when used to estimate the total net flux between regional forest and the atmosphere. Inverse techniques, flux towers, and modeling efforts are less robust at isolating the deforestation component of the total net land-atmosphere exchange. Furthermore, as highlighted in the opening section of this paper, assessment of the total net land-atmosphere flux avails of the large-scale mass constraint of the global budget.

Furthermore, the recognition that there is significant net uptake occurring in intact mature tropical forests will raise the possibility that developing tropical countries may wish to include that uptake in a national baseline estimate or target. There is precedent within the Kyoto Protocol for such net accounting and there is no reason to believe that it will not be an expectation for accounting in the tropical forest regions.

This will raise a series of additional scientific/technical questions, however. An attempt to fulfill a "full carbon accounting" system requires significant institutional and technical capacity in addition to placing pressure on fundamental improvements in understanding the current residual flux.

Unforeseen Events/Interannual Variability

Related to the previous issue of whether to isolate deforestation reductions as the creditable component or include other forest processes, is the issue of what constitutes a direct anthropogenic deforestation activity. For example, observational evidence indicates that strong El Nino/Southern Oscillation (ENSO) events are associated with biospheric carbon loss in many tropical land regions. In the 1997/1998 ENSO event, much of this carbon loss in Tropical Asia was associated with fire. Estimates indicate that roughly 0.8 to 2.6 GtC/year were emitted during the ENSO period due to fires, initiated by human activity, that in normal years would not cause significant carbon emissions. In the dry ENSO time period, these normally controllable fires grew to significant size, burning through deep peat forest land. This event also highlights the fact that both deforestation and the total net tropical land-atmosphere flux has significant variability. These variations can occur on timescales of a few years and remain a topic of considerable scientific research, as alluded to in the introductory section of this paper.

Permanence, Additionality, Leakage, Verification

Both the international and domestic policy discussions raise a series of methodological issues that have direct scientific implications. All recognize the need for any biospheric crediting mechanism to attend to each of these important issues. They were discussed at length during the negotiations leading up to the finalization of the Marrakech Accords and have continued to be important issues as the negotiations consider a post-2012 policy and U.S. domestic legislation considers including tropical deforestation credits as a component of national greenhouse gas mitigation targets. A short definition of each is as follows:

Permanence: The need to maintain and continuously guarantee the integrity of sequestered or set-aside carbon stocks.

Additionality: The need to ascertain what is considered an activity (altered deforestation trajectory, sequestering carbon activity, etc.) additional to what would have occurred without climate policy.

Leakage: The movement of deforestation from an area or country with a deforestation mitigation target to an area or country without such a limit. National targets are a recognized improvement over project or plot-level efforts but may still exhibit leakage should policies not apply across the tropical forest countries.

Verification: Given the current measurement and monitoring challenges, what viable verification opportunities are there for deforestation?

Degradation: An important, but difficult to quantify, portion of tropical forest demise.

CONCLUSIONS

The quantification of tropical deforestation carbon emissions is intricately tied to the global carbon cycle due to the fact that it remains closely linked to the overall net land-atmosphere flux. The scientific understanding of tropical deforestation carbon emissions over scales larger than the plot level continues to evolve. Research has shown that in addition to tropical deforestation emissions, tropical forest regions are also likely sequestering carbon in intact, mature forests. This has significant im-

plications for policy approaches that link reduced deforestation to an international carbon market.

Measurement and monitoring uncertainties remain substantial and have been estimated to be almost 50 percent at the scale of the Brazilian Amazon. Degradation and the spatial variability of biomass content may further increase this estimation uncertainty. Though there is an expectation that this uncertainty will fall due to improvements in satellite remote sensing capabilities and better ground surveys, whether or not these uncertainty reductions are sufficient to support policy goals remains difficult to assess.

A series of additional difficulties persist in the scientific discussions on this topic. These include the ability to establish unbiased baselines, the difficulties of large interannual variability and unforeseen events, biospheric carbon permanence, additionality, leakage, verification, and the challenges of including forest degradation.

Whether or not current scientific knowledge is sufficient to support the policy goals being discussed for international policy and U.S. legislation, rests to a great degree on the implicit policy priorities. If the net radiative forcing of emission mitigation, be they industrial or biospheric, is paramount, the current science on the net impact of deforestation on the atmosphere may be too limited and too uncertain to adequately support the aims of current proposals. If tropical forest preservation is a priority, the potential cobenefit of lowered greenhouse gas emissions may not require a high level of scientific certainty and emphasis should be placed on those aspects that assess the phenomenon of deforestation with less emphasis on the net associated greenhouse has emissions.

References

[1] Denman, K.L. et al., Couplings Between Changes in the "Climate System and Biogeochemistry in Climate Change 2007," The Physical Science Basis, contribution of Working Group I to the Fourth Assessment Report of the IPCC, 2007.

[2] "Carbon" as opposed to "carbon dioxide (CO_2)" is the common unit used by biogeochemists in tracing the many parts of the earth system that influence atmospheric levels of CO_2. A unit of carbon is equivalent to a unit of CO_2 x (12/44).

[3] The atmosphere currently holds roughly 760 GtC of which roughly 200 have been added since the onset of industrialization.

[4] The mechanisms responsible for the residual flux and their evolution in the future is a first-order uncertainty in climate change projections.

[5] See recent research by Bala, G. et al., Proceedings of the National Academy of Sciences, 104 (16): 655–6555.

[6] See Oyama M.D. and C. Nobre (2003), Geophysical Research Letters, 30 (23).

[7] Instituto Nacional de Pesquisas Espaciais (INPE) (2005) Monitoring deforestation in the Amazon from space, available at www.obt.inpe.br/prodes/.

[8] This data comes from World Resources Institute's Climate Analysis Indicators Tool (http://cait.wri.org. While the absolute magnitudes contain uncertainty, the purpose here is to establish relative magnitudes and an ordinal relationship.

[9] Papua New Guinea and Costa Rica proposed to include addressing emissions from deforestation under the Climate Convention using a national emissions approach.

[10] Persson U. and C. Azar (2007), "Mitig Adapt Strat Glob Change," 12:1277–1304.

APPENDIX A: THE "PRESERVATION PATHWAY" APPROACH

A recent proposal attempts to avoid some of the aforementioned technical difficulties, particularly those associated with estimating baselines.[1] The approach, called "Preservation Pathway" combines the desire for forest preservation with the need to reduce emissions associated with forest loss by focusing on the relative rate of change of forest cover as the criteria by which countries gain access to trading preserved forest carbon stocks. This approach avoids the technically challenging task of quantifying historical or future deforestation emission baselines. Rather, it places emphasis on improving quantification of contemporary stocks and the relative decline in deforestation rates necessary to preserve those stocks. This approach places emphasis on the complete emissions trajectory necessary to attain an agreed-upon preserved forest and as such, meets both forest conservation and climate goals simultaneously.

[EDITOR'S NOTE.—The publication mentioned above could not be reproduced in this printed hearing. It will be retained in the permanent record of the committee. It can also be obtained at http://www.cbmjournal.com/content/3/1/2.]

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[1] Gurney, K.R. and L. Raymond (2008), "Carbon Balance and Management," 3(2), doi:10.1186/1750–0680–3–2. A copy is included as an attachment.

Senator MENENDEZ. Well, thank you, Dr. Gurney.
Mr. Forrister.

STATEMENT OF DIRK FORRISTER, MANAGING DIRECTOR, NATSOURCE LLC, WASHINGTON, DC

Mr. FORRISTER. Mr. Chairman and distinguished members of the subcommittee, it is a pleasure to join you today to discuss the potential for the emerging greenhouse gas markets to play a role in addressing the problem of deforestation.

I am speaking to you today from a long history of involvement in the climate change policy debate. Earlier in my career, I served as counsel over on the House side to Congressman Jim Cooper of Tennessee who became interested in carbon trading policies in the late 1980s. He believed that a market-based approach to climate mitigation could attract bipartisan support in favor of legislation. Unfortunately, it has taken a little longer than we envisioned at that time.

Back in the early 1990s, the primary examples of carbon offset activity were forest offset projects in the international arena that were sponsored by companies like AES, New England Electric, and the Los Angeles Department of Water and Power. It is interesting to me that these pioneering efforts have since been overtaken by a much larger global industry that has focused much more on other forms of carbon abatement than forestry. I recently returned to the United States after spending 5 years in my company's London office where I watched firsthand, as the global carbon market took off, and participated in the development of that market.

So today I am appearing before you as a businessman on behalf of 179 members of the International Emissions Trading Association. These companies are all active in the international carbon market. The association includes industry and industrial giants like AEP, Duke, PG&E, AES, Shell, Chevron, DuPont, and Dow. It also includes many of the world's leading financial institutions like Merrill Lynch, Citibank, Goldman Sachs, J.P. Morgan, and Morgan Stanley. There are also a few of the smaller firms like the Chicago Climate Exchange and Natsource—my company—who participate as a part of this membership. And I do think the IETA membership is the backbone of today's carbon market.

My company, Natsource, is active in this market as a fund manager. We are relatively small. We manage approximately $1.2 billion in assets. These assets are entrusted to us on behalf of companies that are seeking compliance with laws for whom we build portfolios of credits from the clean development mechanism and the joint implementation mechanism of the Kyoto Protocol, and we also work on behalf of investors who seek financial returns from these markets.

My company has invested in both U.S. and international forestry projects, but these investments are quite small. They represent less than 1 percent of the purchases we have made. I describe these projects in my written testimony. One of them is an afforestation project in Chile, and the other is an avoided-deforestation project in California that we are investing in, believing that it may comply with the California emissions trading law.

So what I am here to discuss today is how we could tilt our investment so that we could potentially invest even more in carbon sequestration. We and other members of IETA believe that the market should be able to invest in a much larger degree in this sector, but the reasons we do not are quite sensible. It is because the policy environment is not favorable enough to encourage us to go into forestry investments.

And I will describe precisely why that is. Maybe I will start with the grounding of the type of policy that IETA supports in the emissions trading arena.

First of all, the membership is united in our belief that markets are the most efficient way to address climate change and that free markets will ensure that scarce resources are deployed in a way that achieves the maximum amount of emission reductions at the lowest possible cost. We support policies that use allowance trading for covered sources but also allow the import of project-based offsets from facilities outside the capped entities. And we believe that the use of these offsets should be free and unlimited and that this could deliver significant cost savings to the U.S. economy in particular.

We are already watching as in the international arena it is reducing compliance costs. The most recent numbers I could get my hands on were from 2006. We should have full 2007 data soon. But in 2006, European allowance prices averaged right around $22 a ton, and during that same period you could buy international offsets for less than $11 a ton. So it does demonstrate a pretty dramatic cost savings that is evident from use of offsets.

I think EPA's recent analysis of the Lieberman-Warner legislation also bears this out. They have estimated that unlimited use of international and domestic offsets could reduce allowance prices by over 70 percent below the prices in the current bill. Our industry thinks those kind of savings are worth fighting for.

We also believe that given the magnitude of the challenge posed by climate change, that a full range of policy tools should be used and that greenhouse gas markets are just one tool among many that could be valuable in this fight. That said, it is the most successful tool used on the globe to date for mobilizing capital into climate protection.

We do believe that environmental integrity matters on offset projects but that there are rules that can be utilized to ensure environmental integrity and offsets, particularly in the area of sequestration.

The way this market has developed, I think you all know that it has been largely driven by the Kyoto Protocol and the European emissions trading system. That scheme allows limited use of offsets, but it has a restriction on the use of forestry-related offsets. Avoided deforestation, as Ambassador Eizenstat noted, is not a project category allowed under the Kyoto Protocol at all, but there are two small slivers of forest protection that are allowed. One is afforestation, and the other is reforestation.

Unfortunately, those types of projects are not allowed in the European emissions trading system. The national governments from Europe can purchase those types of reductions, but they have not done so in a very large way. So as a result, if you look at the

databases of available credit supplies from various types of abatement strategies, forestry-related projects represent less than 1 percent of the total credits transacted. This sector could do a whole lot more if the credits were permitted to be used more fungibly with other types of commodities in the global carbon market.

Just to give you a sense of the size, Natsource's advisory research unit took a look at it, and in looking at the literature available on this, it looks like somewhere between 15 and 75 gigatons of additional supply could be brought to the market from avoided-deforestation, if those units were allowed to be fungible in the international market. Those could reduce the overall compliance costs by 40 percent.

Just to give you some flavor of the international carbon market, it has been growing rapidly in the last few years. In my written testimony, you will find three charts that sort of sum it up. Last year that market globally was worth just under $60 billion. I think our estimate is $59 billion in total. United States companies, I should say, are active in this market, as a number of United States companies have assets in Europe where they are forced to comply with the European law. There are also numerous U.S. financial, legal, and service firms active in this market.

It trades mostly in European allowances, the primary instrument traded, and of the $59 billion that I mentioned, roughly $41 billion of that represented EU allowance trades. The balance of the investment mobilized by that market was in clean development mechanism projects worth over $17 billion last year. There was a little bit of investment also in a type of credit that can be created in the countries of the former Soviet Union, but they were less than $1 billion in investment last year. I expect that segment will grow.

In terms of policy recommendations going forward, I have already described the limitations on use of forestry-related offsets in Europe has really caused a chilling effect on this particular market segment, and the shortcomings of the Kyoto Protocol, an area of avoided-deforestation, has also chilled investment in those types of assets.

So looking at that policy framework, we would have three recommendations for your consideration in the policy arena.

First of all, a major goal of the design of the post-2012 project-based mechanisms internationally should be to significantly increase investment in forestry-related activities and avoided-deforestation in particular. In addition to its environmental importance, forest sequestration could be a particularly important category for countries and regions of the world that are currently not attracting very much investment from the CDM, such as sub-Saharan Africa. Designing the mechanisms to increase the level of forest sequestration projects is one way to improve the global and regional distribution of investment.

Second, U.S. Federal policy should authorize the use of international carbon offsets and forestry-related offsets in particular as a key tool to control costs of complying with emissions targets here. Proposals that include quantitative limits or restrictions on the use of forestry-related credits for compliance would only increase the costs of the program and create market distortions.

Third, U.S. policy should also support reforms in the project-based mechanisms so that they work better. It is not easy to get projects approved through the clean development mechanism. It is quite a rigorous regime. It is a confusing regime, and it could be improved so that it works swiftly and efficiently and reliably in producing these assets.

In the future, we hope that these markets continue to grow, and we in the international emissions trading community stand ready to assist you as you consider policy alternatives involving our sector and the global fight against deforestation and climate change.

Thank you very much.

[The prepared statement of Mr. Forrister follows:]

PREPARED STATEMENT OF DIRK FORRISTER, MANAGING DIRECTOR, NATSOURCE LLC, WASHINGTON, DC

Good morning, Mr. Chairman and members of the committee. Thank you for inviting me to testify on this important subject. My name is Dirk Forrister, and I am managing director of Natsource LLC, an environmental asset management company headquartered in New York City with offices in Washington, DC, South America, Europe, Japan, and Canada. My testimony will address the potential for greenhouse gas emissions trading markets to help combat the problem of deforestation.

In my remarks today, I will discuss Natsource's experience with:

- Forestry-related carbon offsets;
- The context of today's international carbon markets;
- The minor role that forestry projects currently play in that market;
- The barriers that limit the role of forestry in the effort to address climate change; and
- The potential for improving policy in the future international policy regime to enhance forest protection.

NATSOURCE

Natsource is deeply involved in the international carbon markets on behalf of our clients. We are a leading environmental asset management firm and currently have approximately $1.2 billion in assets under management. This capital is used to purchase greenhouse gas (GHG) compliance instruments on behalf of industrial emitters that are required to reduce their GHG emissions, and GHG reductions and other environmental commodities on behalf of return investors. Natsource Asset Management LLC is a registered investment advisor with the Securities and Exchange Commission. Our staff is comprised of experts that have helped to develop the policies that created emissions markets and others that have participated in some of the first and largest transactions in the GHG market. New Energy Finance, a leading independent analytical service recently ranked Natsource as the largest purchaser of carbon credits (on a risk adjusted basis) in the world. We attach a press release that communicates this award for the record. We have entered into contracts of over $1 billion for these assets.

INTERNATIONAL EMISSIONS TRADING ASSOCIATION

I am also testifying today as a representative of the International Emissions Trading Association (IETA), a trade association representing 179 industrial, financial, and service companies who are active in emissions markets and greenhouse gas emissions trading policy development around the world. IETA is the leading international organization that has participated in the development of GHG markets. Natsource is a longstanding member of IETA, and I currently serve as the chairman of IETA's Clean Development Mechanism (CDM) Working Group as well as its Market Oversight Committee. Jack Cogen, Natsource CEO currently serves as IETA's chairman.

MARKETS ARE THE MOST EFFICIENT POLICY TOOL TO ACHIEVE CLIMATE POLICY OBJECTIVES

Natsource and IETA support the use of emissions trading to address the problem of climate change. We are united in our belief that markets are the most efficient way to address climate change. Free markets will ensure that scarce resources are deployed to achieve the maximum amount of emission reductions at the lowest pos-

sible cost. We support policies that authorize allowance trading for covered sources, the creation of project-based reductions (sometimes called "offsets") from uncapped facilities, and the use of offsets by regulated firms to comply with emissions targets. Natsource and IETA members believe that these policies will reduce the cost of climate protection. There should be no quantitative or qualitative limits imposed on the use of these markets for compliance. Such arbitrary limits only increase costs, diverting resources from investment necessary to achieve other societal objectives. Given the magnitude of the challenge posed by climate change, we believe that all policy tools should be used. Ultimately, a portfolio of actions is required to achieve long-term climate protection. We do not believe that greenhouse gas emissions markets are an end unto themselves, but are a key tool to mobilize capital required to assist and facilitate a cost-effective transformation to a lower carbon emitting economy.

We believe that policies can be developed that ensure the environmental integrity of carbon offset projects. Specifically, offsets created by forestry are a key asset in the effort to mitigate climate change. As you know, stabilizing concentrations of GHGs in the atmosphere at levels under discussion will cost trillions of dollars through the 21st century and ultimately requires the transformation of the energy system. Sequestration of carbon dioxide from the atmosphere in the near term is essential while society is attempting to create the advanced energy technologies which are not yet economically competitive but which are essential to achieving the steeper reductions later in the century to achieve long-term climate policy objectives. We also believe that policies can be designed to guard against potential events which would reverse the benefits of forestry offsets. These are events such as fires or floods.

Finally—and of particular importance to today's discussion—as governments find ways to strengthen and improve the international policy regime to address climate change, IETA's members strongly support broadening the carbon offset market to include new asset classes, such as those that would award credits for avoided-deforestation.

DEFORESTATION

Deforestation in developing countries is currently the second largest source of human greenhouse gases, representing about 20–25 percent of global GHG emissions.[1] According to the Food and Agriculture Organization, global deforestation was estimated to be 7.3 million hectares per year in the period 2000–2005.[2] However, because of concerns about additionality, permanence, and leakage, avoided-deforestation was excluded from the CDM.

We are following with interest proposals that would authorize the creation of offsets from avoided-deforestation, such as Reduced Emissions from Deforestation and Degradation (REDD) championed by Papua New Guinea. We believe that credible, verifiable, and environmentally effective rules can be established to govern the creation of emissions offsets from avoided-deforestation projects. These projects would provide major benefits to host countries and investors in addition to benefiting the climate system.

Natsource's Experience With International Forestry Offsets

Natsource believes that offsets created by forestry are a key policy tool in the portfolio of actions to address climate change. Natsource Asset Management LLC (NAM) has invested in both domestic U.S. forestry offsets and international offset projects on behalf of its investors as part of its portfolio of GHG assets. NAM is making these investments because we believe that they are good investments but also to provide policymakers with the confidence that such projects will provide permanent and enduring benefits. Ultimately, investment is required to build such confidence. However, forestry-related reductions comprise less than 1 percent of NAM's portfolio, due to policy restrictions on their use. We have not invested in avoided-deforestation projects because they are not currently usable for compliance in any governmentally sanctioned emissions trading system.

In Chile, NAM invested in the Nerquihue afforestation project, where open land will be converted into a forest by planting trees to sequester carbon. The project is comprised of 12 small-scale afforestation projects. The project developer has partnered with the individual landowners at the project sites and will act as the project entity.

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[1] Skutsch et. al, "Clearing the Way for Reducing Emissions From Tropical Deforestation," Environmental Science & Policy, 10 2007, p.1.

[2] http://www.fao.org/forestry/foris/data/fra2005/kf/common/GlobalForestA4-ENsmall.pdf.

This project includes the use of advanced forestry technology. Until the 1990s, the project site land was used for intense agriculture and pasture. It is relatively remote and hilly, which hinders the use of mechanized land tending and planting. In addition, the project area for the plantings is extremely dry and lacks natural seed sources. Forest establishment using traditional planting techniques has a high chance of failure due to these dry conditions, and is expensive due to typical mechanized planting techniques. As a result, the project developer will use advanced North American tree inoculation technology that will improve the likelihood that the seedlings will prosper. It is expected to generate around 470,000 Temporary CERs (tCERs) from inception until 2012. This type of unit can be produced under the Kyoto Protocol through reforestation or afforestation projects, but is of less compliance value because the credits must be replaced in the following compliance period.

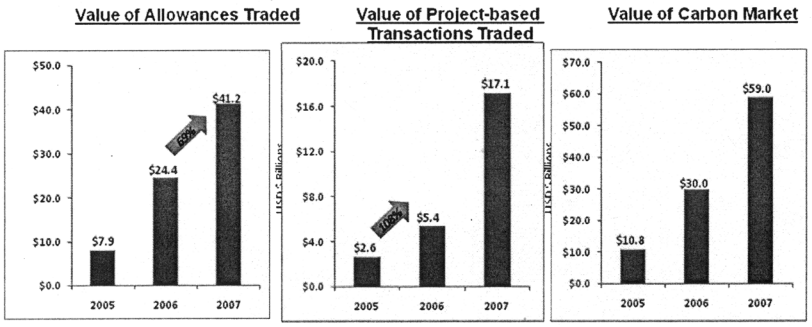
In February 2008, Natsource purchased 60,000 tons of carbon emissions reductions on behalf of its clients from a private forest owner represented by the Pacific Forest Trust. The emissions reductions were created through sustainable forestry on a permanently conserved property in California. This project illustrates the significant role that management of existing forests in the United States can play in addressing climate change. The transaction is the first commercial delivery of certified emissions reductions under the Forest Protocols adopted last fall by the California Air Resources Board (CARB). The Protocols are the first rigorous governmental accounting standards in the U.S. for climate projects embracing forest management and avoided-deforestation, while ensuring emissions reductions are real, permanent, additional and verifiable. We have attached the press release announcing this transaction for the record.

We view these domestic and international transactions as small initial steps in what we hope to be more vibrant involvement in forestry-related offset projects in the future. For that to occur, a more favorable market and regulatory climate is urgently needed.

International Market Context

Greenhouse gas markets or the "carbon market" as it is known to some are evolving and will continue to mature over the next several years. We believe that capital is available to finance activities that reduce deforestation if clear rules are put in place that govern the creation and use of offsets from such activities.

Driven by companies seeking to comply with greenhouse gas emissions targets in Europe and Japan, the international carbon market grew to $59 billion in size last year. (The graphic below illustrates market growth since 2005 and provides data sources.) This market includes trading in several types of compliance instruments, which can be categorized generally as either allowances or project-based reductions. The latter category includes Certified Emission Reductions (CERs) created by the Kyoto Protocol's Clean Development Mechanism (CDM) projects as well as Emissions Reduction Units (ERUs) created by its Joint Implementation (JI) provisions. Within the CDM, two other types of offset can be created for afforestation and reforestation projects (sometimes referenced as "Land Use and Land Use Change and Forestry"—or LULUCF). However, these mechanisms do not award CERs for avoided-deforestation. Allowance transactions comprised $41 billion of this traded value and offsets accounted for the remaining $18 billion.



Although the CDM has been criticized by some from the environmental and investor community, it has stimulated billions of dollars in investments that reduce GHG emissions in developing countries and reduced regulated firms' costs to comply with

emissions targets. CERs and ERUs are generally available at much lower prices than EU allowances, given the lower cost abatement opportunities in developing countries and economies in transition. In 2006, the average price of an EU allowance was approximately $22.10 per tonne, while the average price of a CER was $10.90 per tonne. Given this price differential, many European companies have used CERs and ERUs as important components of their strategy to comply with emissions targets. In addition, Japan has been a large buyer of these assets given that they are cheaper than the cost of reductions that can be achieved in Japan. Many of the U.S. members of IETA with installations regulated in Europe have purchased these assets in recognition of the important role that offsets play in controlling the costs to comply with emissions targets in Europe's trading system. IETA supports the inclusion of provisions in U.S. climate legislation that would authorize the use of international offsets to comply with emissions targets. Compliance costs will be far higher without the use of such assets.

Recent analysis by EPA of the Lieberman-Warner legislative proposal concludes that "the use or limitation of offsets and international credits has a larger impact on allowance prices than the modeled availability or constraint of key technologies."[3] The analysis assumes that international offsets (rather than international allowances) will be allowed up to a 15-percent cap. It finds that eliminating the use of international credits, while still allowing domestic offsets up to the 15-percent cap, would increase allowance prices increase by 34 percent. If domestic offsets and international credits are not allowed, then allowance prices would increase by 93 percent. This translates into additional costs to GDP of $314 billion in 2020. Analysis by New Carbon Finance—which assumes that the bill will only allow use of international allowances, and not international credits—obtained similar results. It estimates that if the Lieberman Warner legislation was modified to allow international offsets up to 15 percent of the allocated amounts, prices would decrease by 60 percent in the period up to 2015 and by 44 percent by 2020.[4]

As mentioned previously, the global carbon market includes trade in both allowances and project-based offsets. In 2007, the $17.1 billion in traded offset value consisted of CERs, created by CDM projects. (It does not include additional, but much smaller, trade in ERUs created from JI projects in countries with economies in transition—Russia, Ukraine, and countries in Eastern and Central Europe.) Given policy restrictions on the use of forestry-related offsets, the World Bank identified that only 1 percent of the traded volumes of offsets in 2006 occurred in agriculture and forestry projects.[5] As of March 5, 2008, there were 3,082 projects in the CDM pipeline, with a headline volume of over 2.5 billion tonnes through 2012.[6] In the Afforestation and Reforestation catagories, there are 17 projects identified, which in turn are expected to produce under 7 million tonnes through 2012.[7]

The reason for the lower degree of market interest in forestry-related offset projects is the restrictive policy environment that exists for such projects.

Policy Drivers for International Carbon Markets

The international carbon market was created by a set of policies that formed the essential elements of supply and demand, which are discussed below. The market demand is driven primarily by compliance requirements of the group of developed countries that ratified the Kyoto Protocol and the programs they put in place to implement compliance with their obligations. The supply of and demand for forestry-related credits is driven by rules as to whether they can be used for compliance and others governing their creation.

The Kyoto Protocol authorized the creation of two main types of project-based offsets, CERs and ERUs. It incorporated these mechanisms to enhance sustainable development, to transfer technology, capital and services from developed to developing countries and transition economies, and to reduce compliance costs for developed country governments and private firms required to meet GHG emission reduction targets. Under the CDM, developed countries and firms invest in project-based activities in developing countries and use the carbon offsets created by these investments to comply with their GHG emissions targets. With limited exceptions, CERs of 2000–2012 vintage can be used for compliance with emissions targets in countries that are parties to the Kyoto Protocol. This gave companies the ability to generate and transact early reductions in advance of the Kyoto Compliance period and pro-

[3] U.S. Environmental Protection Agency, "EPA Analysis of the Lieberman-Warner Climate Security Act, S. 2191 in 110th Congress," March 14, 2008, http://www.epa.gov/climatechange/downloads/s2191_EPA_Analysis.pdf.

[4] New Carbon Finance, "North America White Paper—February 2008."

[5] World Bank, "State and Trends of the Carbon Market 2007," May 2007.

[6] UNEP RISO Center, http://www.uneprisoe.org.

[7] Ibid.

vided an incentive for developing countries to participate in the global effort to address climate change. Natsource Advisory and Research estimates that there are 2.9 billion tonnes of demand from Japan, the European Union and New Zealand.

The European Union adopted the Emissions Trading Scheme (EU ETS) in 2004 as a key element of its strategy to comply with its Kyoto obligations. It requires emissions cuts from over 10,000 large emitting installations across Europe—including heat and power plants, steel mills, oil refineries, chemical plants, paper mills and other heavy industries. Reductions are required in two phases and cover approximately 45 percent of the continent's CO_2 emissions. Regulated installations can meet their targets by tendering allowances or project-based offsets with limited exceptions to Member States. Companies in the ETS face stiff penalties if they fail to comply. In order to provide a disincentive for noncompliance, installations will be fined EUR 100 per tonne for emissions in excess of their targets, in addition to having to pay back each tonne of overage.

The European Union adopted the "Linking Directive" in 2005. It allows installations in the ETS to use CERs and ERUs for compliance up to quantitative limits set by Member States (so called "Supplementarity Limits"). It prohibits use of forestry-related offsets and restricts use of credits from large hydropower projects.

Despite the restrictions on use of forestry-related credits in the ETS, there is some market potential for these instruments in Europe from national purchasing programs. In order to meet the Kyoto targets, a number of EU Member State governments have adopted purchasing programs for CERs and ERUs that may include forestry-related instruments. To give a sense of the potential scale of purchasing by these sovereigns, Natsource Advisory and Research estimates that EU Member State governments will need to reduce emissions by about 0.55–0.95 billion tonnes over the Kyoto period based on current emissions trends and measures that are already in place. These reductions must be achieved through national purchases or other policies and measures for noncovered sectors (transportation, commercial and residential emissions).

The other primary source of demand for CERs and ERUs is Japan. Natsource Advisory and Research estimates that Japan is approximately 740 million tonnes short of its Kyoto targets over the 5-year Kyoto period based on current emissions trends and measures in place. At present, 40 key emitting economic sectors in Japan have entered into a set of voluntary agreements with the Government to cut emissions, and they are allowed to use CERs and ERUs to meet those commitments. Japanese industry is allowed to import forestry-related CERs, which has stimulated some Japanese private sector interest in this asset class.

In addition to these demand considerations, the Kyoto Protocol and the CDM Executive Board have influenced the development of supply of forestry-related carbon offsets. The parties to the Kyoto Protocol struggled for several years to develop guidelines for LULUCF projects under the CDM, ultimately reaching agreement in Milan at the 9th Conference of the Parties to the U.N. Framework Convention on Climate Change in 2003. The COP 9 Decision created two types of temporary credits that address concerns about impermanence of the reductions. However, the rules governing the creation and use of these offsets are difficult to understand, and they create units that must be replaced in the next compliance regime. The complexity of these systems and the limited compliance value of the offsets have created limited market interest in them.

Even apart from its treatment of forestry-related projects, the CDM can be characterized as a complex system. IETA is developing a proposal for improving the overall regulatory approach to the CDM for the post-2012 period. We believe that the CDM's current approach to ensuring environmental integrity imposes significant costs and uncertainty on investors, which in turn has adversely limited the mechanism's potential to mobilize the volumes of capital that will be ultimately required to address climate change. IETA members recognize that the CDM has made a significant contribution to learning and has created major benefits. However, we do believe the mechanism can be reformed to influence an even greater level of investment in the future. We believe that improvements are needed to influence trillions of dollars of large-scale investments in the future that are needed to meet global energy demand, and that will determine in large part whether long-term atmospheric GHG concentration targets can be achieved. We are also interested in providing our views on how the U.S. can learn from CDM in the development of domestic legislation.

Policy Improvements to Tap Carbon Markets to Avoid Deforestation

Forest sequestration—particularly avoided-deforestation—is potentially an important contributor to GHG reductions and to controlling costs of achieving atmospheric concentration targets. Carbon markets could assist in achieving forest-related reduc-

tions, if policies in the U.S., Europe, Japan, Canada, and others were crafted to permit use of this asset class in compliance with emissions limits.

Avoided deforestation projects could provide a substantial share of supply for the international market, if policies were more favorable. Of the two models cited in the IPCC report that consider forest sinks as a category, one model (IMAGE) estimates that they will make the second-largest contribution to cumulative emission reductions in the short-term, from 2000–2030, with approximately 15 $GtCO_2e$. Another study focusing on forest sequestration concludes that forest sequestration can account for an even larger share of global abatement—one that is in proportion to tropical deforestation's large (25%) share of global anthropogenic GHG emissions. The study estimates that forests can sequester as much as 75 GtC (i.e., 275 $GtCO_2e$) cumulative to 2050, or approximately one-third of total abatement.[8] This would result in an estimated reduction in the price of carbon of 40 percent by 2050.[9]

In light of the importance of forest sequestration for achieving environmental and economic objectives, we would make the following recommendations for your consideration:

1. In the international arena, a major goal of the design of the post-2012 project-based mechanisms should be to significantly increase investment in forestry-related activities and avoided-deforestation in particular. In addition to its environmental importance, forest sequestration could be a particularly important category for countries and regions that currently are attracting less CDM investment, such as sub-Saharan Africa. Designing the mechanisms to increase the level of forest sequestration projects is one way to improve the regional distribution of investment.

2. U.S. federal policy should authorize the use of international carbon markets, and forestry-related offsets in particular, as a key tool to control costs of complying with emissions targets. Proposals that impose quantitative and qualitative limits on the use of markets for compliance will increase costs and create market distortions.

3. U.S. policy should support reforms to the project-based mechanisms in the international negotiations to develop a successor agreement to the Kyoto Protocol designed to ensure environmental integrity while attempting to mobilize larger volumes of capital. This system should provide a more reliable, predictable approach to asset creation that will help stimulate greater amounts of investment in emissions mitigation projects around the world.

In the future, we expect that international carbon markets will continue to grow as the international community negotiates a successor agreement to Kyoto and as nations implement policies to achieve their climate goals. IETA members believe that international emissions markets must play a key role to assist governments in meeting their emissions targets in a cost-effective manner. In order for the market to truly realize this ambition, it is important to include the widest range of emission reduction and sequestration strategies in the set of eligible activities for offset creation.

In conclusion, Mr. Chairman, we appreciate the opportunity to testify about the potential for emissions markets to be tapped for protecting the world's forests. As you consider policy alternatives for advancing this objective, we stand ready to assist you.

PRESS RELEASE OF THE PACIFIC FOREST TRUST AND NATSOURCE ANNOUNCE LANDMARK TRANSACTION OF FIRST FOREST-BASED CO_2 EMISSION REDUCTIONS CERTIFIED UNDER CALIFORNIA RULES—FEBRUARY 11, 2008

NEW YORK, NY, AND SAN FRANCISCO, CA.—The Pacific Forest Trust (PFT) and Natsource Asset Management LLC (Natsource) announced today the completion of a landmark transaction of certified forest carbondioxide (CO_2) emissions reductions. Natsource, a leading emissions and renewable energy asset manager, bought 60,000 tons of carbon emissions reductions on behalf of its clients from a private forest owner represented by PFT. The emissions reductions were created through sustainable forestry on a permanently conserved property in California. This deal illustrates the significant role that management of existing forests can play in addressing climate change. The transaction is the first commercial delivery of certified emissions reductions under the Forest Protocols adopted last fall by the California

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[8] "Forestry and the Carbon Market Response to Stabilize Climate," M. Tavoni, et al., Fondazione Eni Enrico Mattei, Working Paper 2007.15, 2007, http://ideas.repec.org/p/fem/femwpa/2007.15.html. As a source for the 25-percent figure, the report cites Houghton, R.A., 2005. "Tropical Deforestation as a Source of Greenhouse Gas Emissions," in: Mountinho, P., Schwartzman, S. (Eds.), "Tropical Deforestation and Climate Change." IPAM: Belem, Brazil and Environmental Defense: Washington, DC, pp. 13–21.

[9] Ibid.

Air Resources Board (CARB). The Protocols are the first rigorous governmental accounting standards in the U.S. for climate projects embracing forest management and avoided-deforestation, while ensuring emissions reductions are real, permanent, additional and verifiable.

"Today marks a significant milestone for the recognition of the real benefits of conserving and managing U.S. forests to enhance their climate contributions," announced PFT president Laurie Wayburn. "Investing in the power of forests to protect our climate is a practical action that can and should be taken now to reduce CO_2 in our atmosphere. We are hoping that deals like this will provide policymakers around the world with the confidence they need to ensure that forestry becomes part of the solution to address climate change."

CARB's leadership in adopting the Forest Protocols is helping to stimulate a new asset class in global GHG emissions markets, validating forests as a cost-effective means to achieve real GHG reductions. The Forest Protocols, which are administered by the nonprofit California Climate Action Registry (CCAR), can be used as a model to ensure that forests be used to achieve enduring benefits and become a solution in the fight against climate change.

"Until now, forest sequestration has been an untapped asset in the effort to address climate change," said Jack Cogen, Chief Executive Officer of Natsource. "Forestry can and should be an important part of the portfolio of climate change solutions moving forward. This deal illustrates that when rigorous, clear rules are adopted, these investments can reduce costs for our compliance customers and provide what we believe are attractive investment opportunities. Natsource participated in this transaction because it complied with California's rigorous standards, and we believe that this will ensure that the sequestration will provide enduring environmental and economic benefits."

The CO_2 emissions reductions purchased by Natsource clients were created by PFT's Van Eck Forest Project, in Humboldt County, CA, that uses the CO_2 storage capabilities of a working redwood forest. Owned by the Fred M. Van Eck Forest Foundation, the 2,200-acre forest is permanently protected by a conservation easement. It is managed by the Pacific Forest Trust to increase carbon stores, restore biodiversity and produce sustainable timber supplies.

The revenue from the purchase of some of the emissions reductions already generated by this project will help finance the ongoing forest stewardship activities that will enable the forest to remove an estimated 500,000 more tons of CO_2 from the atmosphere than would otherwise occur over the next 100 years—all while still supplying substantially the same volume of wood products from the property that would have been harvested under conventional management. Carbon sequestration is enhanced on the Van Eck Forest by preventing business-as-usual logging of all the substantial volume of standing timber on the property and by ensuring that selective harvest practices remove less timber volume than is grown, allowing carbon stores to permanently increase.

The project's emissions reductions are calculated using the scientific accounting standards of the Forest Protocols, based on a detailed inventory of the forest and the effects of management parameters secured by the permanent conservation easement. These calculations have been registered with CCAR after independent third party certification by SGS, the world's leading inspection, verification, testing and certification company, working with Scientific Certification Systems, the leading U.S. forestry certification company. Project data is available to the public from CCAR.

"Dangerous levels of CO_2 in our atmosphere are the result of fossil fuel combustion and forest loss,"continued Wayburn. "To successfully stabilize our climate, we must address both sources. Preventing forest loss and increasing net sequestration through projects that meet rigorous standards, such as those in California, can secure lasting emissions reductions."

As the first asset manager to purchase Van Eck Forest emissions reductions, Natsource joins an impressive group of climate leaders that have invested in the power of working forests through the Van Eck Forest Project, including U.S. House Speaker Nancy Pelosi, California Governor Arnold Schwarzenegger, California Assembly Speaker Fabian Nuñez (D) and California Environmental Protection Agency Secretary Linda Adams.

"I applaud Natsource for investing in the long-term climate benefits of California's forests. Natsource's leadership shows that global capital will flow to projects that meet rigorous international standards reducing emissions of CO_2," commented Mary Nichols, Chairman of the California Air Resources Board, the lead agency for implementing the state's Global Warming Solutions Act.

NATSOURCE RECOGNIZED AS WORLD'S LARGEST PURCHASER OF CARBON CREDITS BY LEADING INVESTOR RESEARCH FIRM

ANNUAL MARKET SURVEY BY NEW ENERGY FINANCE CITES NATSOURCE COMMITMENT IN LARGE TRANSACTIONS

NEW YORK, NY, MARCH 6, 2008.—Natsource, a leading environmental asset manager, today announced it was named the largest buyer of contracted carbon credits by New Energy Finance in its annual survey of activity in the renewable energy and low-carbon sectors. Natsource acted as a principal on behalf of its clients. The report noted that Natsource has contracted for over 100 million credits from Clean Development Mechanism (CDM) and Joint Implementation (JI) projects. These credits were contracted for in Emission Reduction Purchase Agreements in excess of $1 billion.

"We are pleased to be recognized for the work we have done in the growing carbon market on behalf our compliance customers and return investors," said Richard Rosenzweig, Chief Operating Officer of Natsource. "Natsource will continue to be a leader in the EU and Kyoto markets and we look forward to bringing our expertise to the evolving U.S. market."

New Energy Finance, based in London, is a leading independent provider of research to investors in renewable energy, biofuels, low-carbon technologies and the carbon markets. Its annual survey on activity in the carbon markets has been published since 2005. The ranking methodology used by New Energy Finance includes only those projects for which credits have been contractually committed for purchase by the principal.

Natsource's Asset Management Unit is a leading environmental asset manager, with a principal emphasis on greenhouse gas markets. It is comprised of the Greenhouse Gas Credit Aggregation Pool (GG–CAP), private investment vehicles and a series of managed accounts. GG–CAP, whose participants include some of the largest power, energy and manufacturing firms, uses its participants' capital to purchase and manage delivery of a large pool of Certified Emissions Reductions (CERs) created by CDM projects and Emission Reduction Units (ERUs) created by JI projects that participants can use to comply with GHG emissions targets from 2005–2012.

Natsource Asset Management LLC manages private investment vehicles and a series of managed accounts. These investment oriented vehicles pursue a strategy designed to take advantage of significant opportunities that exist in global emission and renewable energy markets.

Senator MENENDEZ. Thank you all for your testimony. There are a lot of insights, also it sounds like some challenges along the way.

So let us start with 7-minute rounds, and we will recognize myself.

Let me ask you all: Does it make sense to allow companies to earn emission credits for funding subnational avoided-deforestation projects before we require those host countries to be accountable for national benchmarks on lowering deforestation rates? I heard some of the challenges associated with that.

But it seems to me that we have to start off knowing where the commencement is in order to understand where we are going. And the flip side of that is given the scope of the problem, would waiting cause too much in terms of delay?

And finally, on the other hand, are we pouring money into a problem when we might not have the adequate benchmarks to figure out whether or not the funding is achieving the purported goal?

I am very interested in this and believe in it, but I also see the challenges here. I invite the panel's responses to those questions, anyone who wishes to.

Mr. Hayes.

Mr. HAYES. Thank you, Mr. Chairman.

I think you have hit a very key question, Mr. Chairman, because the challenges that Mr. Forrister just talked about in terms of the clean development mechanism and how it is operating under the Kyoto system are squared or cubed when it comes to forestry con-

servation. Under the CDM, there are understandings about "additionality"—about showing that a project would not have occurred anyway—which is a prerequisite for it. There is an established understanding of how to measure the reductions for specific projects in specific sectors. There is an understanding of how to deal with permanence, et cetera. And it is done on a project-by-project basis. The projects have four corners to them and they can be tested and evaluated.

When you move into the tropical forestry context, you lose a lot of those moorings in terms of, for example, whether you can proceed on a project basis, which is the first part of your question, because of the leakage concerns and the concern that we would protect this forest here, but the folks who would otherwise have deforested that will simply move over there. I think there is a strong view that we need national baselines, and that we cannot test for progress on a project-by-project basis. That is an important concept that is in the Lieberman-Warner bill; we should only be working with countries that are willing to put those national baselines into effect. And I think that makes perfect sense because the problem of leakage is so critical.

The other issues and challenges that I mentioned, including the permanence concept and the additionality concept also must be dealt with differently because we are talking about, almost by definition, protecting forests as opposed to afforestation, planting forests. So we are going to have to have a new concept.

I think my bottom line, Mr. Chairman, is that we should be focusing lots of attention and finances on pilot projects in tropical countries. We certainly should not wait until all of the infrastructure is in place, but we should simultaneously work on putting that infrastructure in place, as we do pilot projects to help get at some of the issues of capacity-building, of measurement technology, of verification approaches, et cetera.

Senator MENENDEZ. Ambassador Eizenstat.

Ambassador EIZENSTAT. I would like to take a slightly different view if I may, and that is the question of where relative risks are. There is no question, as we have all indicated, that establishing a national baseline for countries is absolutely critical. That will do a great deal to avoid the problem of leakage and to give us a better monitoring device. There are mechanisms. The World Bank has a fund to do this. Norway is providing assistance to do it. We could do the same.

But—and here is where I perhaps differ in terms of emphasis from David—I think that the risks of cutting forests and the pressures are so great with particularly rising commodity prices that if we do not take the leap early, while we are building that capacity, while we are seeking to have a more perfect system, we are going to make the perfect the enemy of the good, really.

That is to say, it is going to take time for Congress to pass legislation. It is going to take time for that to be implemented. If we do not include in that legislation now, provisions to allow this kind of international trading in forestry credits while we are building the capacity and we say, well, let us wait 4 or 5 years to see if it goes, we will have deforested whole areas of the Amazon, Indonesia, and other tropical and subtropical forests, which we will

never get back. So there are risks to doing this without having a perfect national baseline system.

But we have, which we did not have at the time of Kyoto—and one of the reasons I was not able to get that in is we did not have the kind of telemetry by satellites that we have now. Brazil has a very good system. They are willing to put the data on the Internet free of charge. There are ways to measure this so that by the time we get the legislation passed and implemented in the United States and we develop this international credit system, hopefully the baseline that we all hope will be there.

But again, I do not want to make the perfect the enemy of the good and feel that we have to wait until we have everything done before we deal with this area, or we are going to have whole areas deforested which we will never get back.

Senator MENENDEZ. But countries like Indonesia and Brazil, are they willing to go with a market-based approach alone, or are they looking for international——

Ambassador EIZENSTAT. Well, that is a very good question. Brazil, until recently, has been looking at having an international fund of ODA assistance. But again, as we have all suggested, you cannot get enough money together on a consistent basis to provide the kind of incentives you need to avoid the deforestation with the tremendous pressures of rising commodity prices to cut and then to plant. You simply cannot do it. You have to have a combination.

I was on a panel recently with the Governor of Amazonia, and he is saying—and now his national government is beginning to come along—that you cannot do it through a national fund alone. You have to have carbon credits, harness this $60 billion market and combine those.

Second, the rainforest nations, which have taken the lead, are themselves indicating that they will try to establish, with the help of developed countries, this national baseline system we all want. So they want to have a system that has integrity. They realize, over the long term, if they do not, that the system will not work. So we are pushing against a more open door than we might think because the countries that are pushing hardest for this in the rainforest coalition want to have the kind of national baseline system that we are talking about.

Senator MENENDEZ. I have some other questions, but I will wait for the next round. With that, I recognize Senator Lugar.

Senator LUGAR. Thank you very much, Mr. Chairman.

In your testimony collectively, you have illustrated that most of the carbon released in the atmosphere from countries like Indonesia and Brazil—and these are very large countries with growing industrial power—still comes from the cutting of trees. Apparently there is recognition in both of those countries that this is so, and you have implied, without making it explicit, that they must surely appreciate that given the current discussions we are having, those trees have value to the international community in terms of international negotiations, an extraordinary amount of value.

You have illustrated examples in which baselines are discussed on a national basis. Just out of curiosity, with Brazil is there an estimate by the Brazilian Government of how much carbon are in

all the trees of Brazil, or can any of you quantify a little bit more precisely what is meant by these national baselines?

Dr. Gurney.

Dr. GURNEY. Sure. Yes, I mean, there are certainly estimates. I could not tell you off the top of my head what the estimate is for Brazil, but certainly it has been done both by national entities within Brazil and, of course, by members of the scientific community outside of Brazil.

The topic of baselines—and sort of maybe somewhat segueing with the answers to the last question, since they are revolving around a similar topic, the idea of baselines and monitoring and measurement. I just want to touch on one thing about satellite remote sensing since it is going to come up and it is going to come up repeatedly. Satellites are very good at looking down at the surface and ascertaining what the canopy cover is and have gotten much better at elucidating places where deforestation has occurred.

The big problem—the difficulty is actually figuring out how much carbon that represents and, when a canopy changes, how much carbon goes from the land surface into the atmosphere. That is actually in many ways becoming the hardest part of the problem because it is something that is much more difficult to do from space, although there are actually techniques emerging to actually partly do that estimation from space. Satellites cannot see below the canopy, so if forest degradation occurs, whereby vegetation is manipulated below the canopy, it is very difficult to see from space. Soil carbon, dead biomatter, all those components of forests are difficult to see from space.

And that is why, in many ways, establishing baselines, though it can be done—the forest cover can be established and forest cover change can be established. The amount of carbon forests hold and the amount of emissions associated with the changing forests is really the difficult part of the problem.

And that is why, in many ways, baselines have become tough, particularly at the national scale. On an individual plot level, you can send a lot of human beings into a plot, spend an awful lot of effort, and get good estimates of how much carbon is resident in a system and how much carbon is coming out of the system when things change. But to do an extrapolation across a nation like something the size of Brazil brings up a variety of other difficulties. The landscape is heterogeneous. It changes from one place to the next. Some areas like the Brazilian Amazon are little studied and large and variable.

So baselines, particularly when you go back in time, become even harder, obviously, because going back to the 1980s, for example, satellite remote sensing was not as sophisticated as it is now. Survey work was much more limited than it is now. And hence, trying to determine baselines or trying to create baselines that are historical in nature is much more difficult.

Senator LUGAR. But given all those qualifications, though, I think Mr. Eizenstat was pointing out that still some interim tries may be necessary if we are to make some progress. I think we all would recognize with common sense how difficult this is.

But let me just take a micro example. I have touched upon our farm in Indiana. Other farmers in Indiana have come to me—and

this is why Chicago Climate Exchange was hopeful I might be a member, and I said, how do I get into this business? Well, not easy. The initial idea has to be these are new increments of trees. No measurements right now, as I understand it, of trees that are already on the farms.

When we are talking about the specifics of commodity changes in a State like Indiana, this is a crucial question. People are prepared to get out of the Conservation Reserve Program. Those who never got into it are certainly not going to sign up. This is going to be a big issue for Brazil, but it is a big issue in the United States. Unless there is at least some way to jump-start of how you evaluate the trees that we have and keep them alive, some problems are going to occur.

Now, this is a jump over those who are ready to recognize treaties to begin with, but I just want to extrapolate out of the foreign experience that which is domestic. And that will be true, as we know of other countries in the world. The world food crisis will not go away. This is not simply a first-year process. We now have people that are eating better, thank goodness, all over the world, and we have demands for greater food, and inequality of the ability of people to get to it.

So this is a crucial question that, just getting back to your discussion, requires a lot faster timeline. It may be these are rough and ready calculations, and international negotiations among Brazil, Indonesia, the Europeans, and the United States to roughly estimate what have you got, and how much is it worth to the world, in order to be able to sequester this carbon and keep it in the trees.

Any of you think of how you get into this kind of massive international negotiation?

Mr. HAYES. Senator, if I could. I agree with you that we need, to some extent, jump off the cliff and do a lot of experimenting, et cetera. Part of the contextual challenge is that the assumption that a lot of folks have is that we are talking about a system like the clean development mechanism under the Kyoto Protocol that will generate pound-for-pound reductions that U.S. companies, for example, industrial companies, can credit against their account and use in the same way that they would use a reduction in their own emissions, by investing and reducing their own emissions. That puts an enormous amount of pressure on the credibility that we put to that offset, if you will. And at this point, I do not think the forestry sector can take that pressure because of these issues.

Now, there are a lot of creative ideas out there about potentially having a dual market approach where, instead of directly putting pound for pound those carbon reductions from forestry offsets into the account of a U.S. regulated company, perhaps there is an overall pool of expected reductions that we are going to get out of the forestry sector, maybe with some discounting mechanisms, some other creative efforts to get the program underway, but to assure folks that there will not be a flood of these credits coming onto the market, that U.S. companies will not be able to use these kinds of credits too cheaply to avoid choices that need to be made if we are going to really reduce reductions. I think there is a lot of room there. But I think, Senator, that assuming we are in this box that

an offset credit from Brazil gets credited pound for pound in the United States like any other United-States-based reduction is the source of a lot of the difficulty.

Senator LUGAR. Thank you very much.

Mr. FORRISTER. From a market standpoint, I would just add that in the clean development mechanism, there are many project types that have measurement challenges. That does not mean we do not do them. It means that the CDM executive board has set strict rules for conservative application of measurement and verification techniques so that they do not print too much money, if you will. So it has been pretty conservative in the application. And I think those same types of systems can work in the avoided-deforestation universe.

I personally totally agree with Ambassador Eizenstat that you do not want to let the perfect be the enemy of the good, and to us in the market, the holy grail is always a national baseline. That is where we would like things to move because it is very simple to measure against.

But realistically speaking, there are a lot of smaller countries involved in the Kyoto process that have not been participants in the market yet. Probably the only type of projects they have that might make sense would be forestry-related projects, and if you burden them with a national baseline right away, it would be very difficult for them to participate.

So I think this is an area where maybe one size does not fit all. Larger, wealthier countries could be positioned to work toward national baselines more quickly than smaller, poorer countries, so perhaps we should create a graduated approach. Countries taking national baselines could get in early, as an incentive for them to get involved.

Senator LUGAR. Thank you.

Ambassador EIZENSTAT. I also think that this notion of flooding the market with forest credits is not a valid concern. If compensation for reduced deforestation is phased to correspond with actual annual emissions reduced—that is, it would be no higher than the annual deforestation baseline—then the amount of credits available in any given year would be limited.

In addition, the cost of assuring credits meet quality standards, companies' concerns with country risk and constraints on the ability of forest protection efforts to mitigate climate change beyond a certain point—for example, if all deforestation could be halted, it would only account for 20 percent of current emissions—place inherent limits on the ability of credits to flood the market.

So again, I think it is very important not to throw out—it is fine to be cautious. We want to do the right thing. We want to have national baselines, but I think if we raise these kinds of red flags, it can scare us away from doing what is absolutely essential to reduce costs at home and incentivize countries abroad not to cut down their forests.

Again, I just come back again and again to the notion. We are running out of time on this. The pressures to cut these forests are immense. It is almost an exact parallel. The higher, for example, soybean prices are, the more forests get cut down in Amazonia. And with commodity prices soaring for the medium term and per-

haps long term, if we do not have a counterweight to offer these countries, then by the time we come around to the perfect solution, there will not be anything to save.

Senator MENENDEZ. I appreciate the discussion because I also think valuation does not have to be static. We can have a more conservative estimate at the beginning and as science continues to move in the direction of greater exactitude, we can raise the valuations along the way.

Senator Kerry has done a lot work in this field.

Senator KERRY. Mr. Chairman, thank you very much. Thank you for having this hearing.

I welcome all of you here. I particularly want to welcome Ambassador Eizenstat who I had the pleasure of being with in Kyoto and watched him pull together what had really been an inadequate preparatory runup to the meeting and, frankly, salvage what he could in what I thought was a superb job of negotiating. And I really applaud you for what you achieved there, which was very, very difficult.

Listening to this, I think a lot of interesting and appropriate questions have been asked. But we can measure forest carbon, and we can price it. I mean, all of those things are achievable. What I am not sure we can do—and I would like you all to comment on it a little bit—is find the political willpower and define the economic reality of how we are going to make this transition.

I have had the pleasure, through my service on this committee, of flying over or spending time on the ground in these forests in the Philippines, in Laos, Cambodia, Burma, Indonesia, the Amazon, and it is shocking. Five and ten years ago, the amount of illegal clear-cutting that I saw, flying over that Laotian triple canopy, was astounding. The enforcement piece of this has not been talked about—and that is perhaps one of the most significant pieces of this.

I was just recently in Indonesia. When I was in Bali, I met with the Indonesian Environment Minister and his staff to discuss this. And they sort of look at you with a wink and a nod and a smile. But the fact is everybody knows what is happening under the table and around the corner. The pressures economically to continue to illegally harvest timber are just going to be gigantic.

Time magazine a couple weeks ago had a superb photograph that showed the Amazonian deforestation—you just see miles upon miles of lush green soybean growing and this one little patch left of triple canopy. It makes you cry when you look at what is happening. The latest satellite shots portray the level of deforestation. The percentage is just enormous and growing. Ambassador Eizenstat is absolutely correct about the time imperative here.

And the economic pressures just grow. Take Brazil as an example. Cattle ranching and soybean production is causing most of the deforestation there. You have to provide an alternative source of income for people. I mean, the economic realities in most of these countries is that if these folks do not have an alternative job and place to earn a living, this is all pie-in-the-sky talk.

None of those issues are being adequately addressed even as we talk about putting the credits in place, because underneath the

market structure is this illicit trade that is going to take place because the economics push it so imperatively.

So we have to get an enforcement mechanism in place that goes along with the measuring and the transparency. And these countries are going to have to sign up and be part of this because we cannot go in there and enforce for them, obviously. So there is a huge task to accomplish.

Eighty-five percent of Indonesia's greenhouse gases come from deforestation now, and they are in the top 20 of the world's countries contributing as a result of deforestation.

Ambassador EIZENSTAT. The top five.

Senator KERRY. The top five. And particularly in the last year or two, it has been massive. I mean, as you fly over these tropical forests, you see these massive burns taking place, all of which contributes to climate change.

So I would like you to address that. I know we can measure deforestation. I know we can establish a price for carbon. I know we can put in place a trading mechanism. The question is, Can we get these countries to sign on and what will be the economic reality of the transformation of their economies so they do not have a revolution, so they do not lose their governing capacity? I would like you to address that.

Ambassador.

Ambassador EIZENSTAT. I could just start. First of all, the fact that we had a treaty was significantly due to the fact that Senator Kerry was there. He was a virtual part of our negotiating team, and without his day-and-night support and lobbying of the EU, we would never have gotten a treaty.

I think that the political will is there, and I cite two examples. One, which I mentioned in my testimony, is there are some 15 to 17 countries in the rainforest coalition of nations who are saying to the world and said at Bali, provide us incentives, and our contribution will be to take specific commitments not to cut our forests down. Now, is that perfect? Of course, it is not, but neither are any other——

Senator KERRY. We have to go beyond the fund and the credits.

Ambassador EIZENSTAT. Absolutely. What they are saying is give us incentives and this is our contribution.

Now, we have been looking. I mean, you know at Kyoto—and Mr. Chairman, the terrible problem we had—we had two major problems. One was dealing with the EU, which wanted to exact as much pain and suffering on their companies as they could without offsets, sinks, and so forth. I mean, I was Ambassador to the EU and that is another story.

But the second problem was China and India had a choke hold on countries like Argentina and others who wanted to take commitments. They would not allow it. It was written into Kyoto.

Now we have got a group of countries who are saying, look, we are not going to take economywide emission. It does not make sense for Papua-New Guinea and countries like that to do it. But our contribution—just exactly what you said in your really brilliant opening statement about the fact that every country has an obligation but some have different obligations depending on their level of—they are saying, our obligation, our commitment, our participa-

tion will be not to cut our forests down if you provide those incentives. And they have the political will. They formed a coalition, and they are lobbying for this.

In addition, Brazil is in fact beginning to change its policy. People mentioned the New York Times story on Sunday. The flip side of that, the positive side, is, for goodness sakes, they are now committing resources to stop the logging, to stop the cutting. I mean, yes, there is leakage and there are problems, but the fact is they are now taking steps themselves to make sure that those soybeans that you saw do not grow. And if we do not provide them incentives to do that, then we are going to find that the pressures from farmers and others will be overwhelming.

Senator KERRY. Well, I think that is well said. One hopes it will happen.

Do you see a sufficient level of global leadership within the developed countries to try to put those incentives on the table?

Ambassador EIZENSTAT. I think that is why it has to start with our legislation. In June this is going to be debated, and the best way, Senator Kerry, for us to show we are serious on the forest issue is for someone, either the chairman's mark with Lieberman-Warner or one of you on this committee, to introduce—in the 15-percent allowance that the bill permits for international trading, to specifically say that forestry credits are permitted as part of that 15 percent. That will send a signal to these developing countries. It is the single most important thing that could be done when this comes up for debate.

Senator KERRY. I agree completely. Senator Menendez and I will try to get it in the mark.

Did you want to comment, Mr. Forrister.

Mr. FORRISTER. Just to say that—I guess in a way stating the obvious that you are right that the Europeans have, up until this point, not had a great appetite for forestry-related carbon products coming into their market. But I do think, as they look toward the increased level of stringency going out into the future and the potential demand from the United States and Japan and other countries, as they ratchet down further on their commitments, additional tools are going to be needed to supply the growing market. I do think there is value in providing the incentive from the financial side, so that there is a pull on these types of forestry credits. This would mean that there is value in keeping your forests standing, which would tend to create an alliance with the landowner to try to protect that forest and keep it standing because, otherwise, they do not get the reward of the money for the forestry offset. So I do think that this fundamental design element is what is core to the policy.

There does need to be enforcement locally. That is a very important component of making the policy work. But at the same time, the financial value reinforces it: They just do not get their money unless the forest continues to produce the carbon benefit.

Senator KERRY. Absolutely. I could not agree more.

Mr. Hayes.

Mr. HAYES. I just want to make one related point, Senator. Your point is very well taken in terms of the local politics needing to work for these countries.

And I think it is important to put sustainable forestry into this mix here. I do not think we can have a situation where you simply have large cash payments going to countries that are avoiding deforestation and think that that is going to change the economic drivers here. There are tremendous advances that are being made in terms of sustainable forestry, of keeping forests that are producing forest products that are sequestering carbon in those products, that are protecting canopies with those products, and that is another place where the United States can lead through amending the Lacey Act, for example, and requiring that there not be products coming into the United States that are illegal, and more importantly probably, putting a forward push on demand by asking for certification that products are coming from forests that meet sustainable standards. I think these practical, on-the-ground things are extremely important.

Senator KERRY. My time is up. But to accomplish all of these things, I think you will agree you really have to have a robust international transparent and accountable enforcement mechanism. And those countries are going to have to sign up to that line. We have not yet achieved this, but I think we are moving in the right direction. You give it enough economic value without creating allowances that are just giveaways for bad practices or that encourage leakage, et cetera. You have got to have a comprehensive piece here. If we do that—and I think it is doable—then, hopefully, we can encourage a sufficiently robust effort on the enforcement piece.

I was chairman of the Fisheries Subcommittee on Commerce for years, and we have been struggling with too much money chasing too few fish. And we do not have enough monitors. We do not have people out there who are enforcing across the board. And I think the same thing will be true in this sector as the demand grows for those hardwoods, for the mahogany and the teak—you are going to have tough enforcement.

Senator MENENDEZ. Dr. Gurney, I saw you——

Dr. GURNEY. No. Just a very quick comment just to emphasize that there is, obviously, a linkage between the financial incentive and the mechanisms those take and the magnitudes and this monitoring measurement question.

Just to go back to the previous comment, again, some of the largest sources of uncertainty are, in fact, the in-country capacity, technical capacity, human capacity, infrastructure. That is actually where probably the biggest difficulty is faced from the scientific point of view.

So certainly, again, there is a linkage between—with a sufficient price signal, there is a coevolution between the ability to improve measuring and monitoring and the power and strength of that price signal. So it is important to recognize the two will most likely coevolve since the weakest part is, in fact, probably the in-country technical capacity component.

Senator MENENDEZ. So clearly there would be an incentive for the greater the ability for the evaluation to take place, the greater the value that may rise in terms of the credit.

Ambassador EIZENSTAT. And I think what I would say to supplement the professor, which is certainly true about the capacity, you have to have both satellite capacity above and you have the in-

country capacity on the ground. The in-country capacity in countries like Brazil is improving. It is not where it needs to be.

But my point is twofold. No. 1, while we are building that capacity, let us put the legislation in effect. And No. 2, there are mechanisms. The World Bank Forest Carbon Partnership facility is trying to provide assistance for just that purpose. The Norwegians just announced an aid package for forests. We could do the same. So we need to build that capacity on the ground. There are mechanisms to already do that, and by the time the legislation passes the Senate and gets implemented, we will be much further along not with just the satellite telemetry but with on-the-ground capacity-building in the countries themselves.

Senator MENENDEZ. Let me follow up. I thank Senator Kerry for his intervention. Let me follow up with two last questions, and then we will let you go.

One is along the lines of something I thought Senator Kerry was mentioning, and I wanted to pursue it in my second round which is the whole sustainable development aspect of this. Just like when we were dealing with Plan Colombia in a different context, one thing was to do the enforcement, but if you do not give a poor coca farmer an alternative to sustain his family, he is going to continue to grow coca and that is not in our interest. Similarly, here there are obviously consequences as well. Logging is not necessarily the only action that is being taken here.

And the question is, Should part of the inducement be how we create sustainable development alternatives, be to create incentives toward sustainable development in these countries that have the rainforests?

Ambassador EIZENSTAT. Absolutely. I, 100 percent, agree with what David said. I think we should strengthen the Conservation Act, the Leahy amendment, exactly as David said. We ought to make it increasingly difficult to import logs from countries that do not have sustainable development programs, and the kind of certification program I think which David mentioned makes all sorts of sense.

So this has to be attacked from a variety of ways. We need ODA for funds. We need a carbon market to include forestry credits. We need sustainable development programs. All of these together have to be considered as part of a whole.

Senator MENENDEZ. This subcommittee, which also holds jurisdiction over all of our foreign assistance—it seems to me that one of the marriages we want to be looking at here, particularly as it relates to these countries, is what are we doing in these countries in terms of USAID and other related development assistance projects to marry some of that together. Would that be something that is desirable?

Mr. HAYES. Absolutely, Mr. Chairman. I mention that in my written testimony as well.

And to make a related point, there can be unintended consequences here if we do not design the program correctly. For example, the problem of palm oil plantations in Southeast Asia has been well documented. We want to make sure that not only do we have sound economic architecture here for such a program, but that it be environmentally sound, that it preserve biodiversity prin-

ciples, et cetera. We are encountering some of those same issues here at home, and we need to just be aware that they should be part of our design for any international program.

Senator MENENDEZ. Mr. Forrister.

Mr. FORRISTER. I think there are ways that aid programs could be tremendously beneficial in helping with local capacity-building and helping to train the scientists and the local verifiers, et cetera about how to operate these types of projects. As I think about it, in the business that I have been in over the last several years, a lot of us in the carbon business have benefited by work that USAID was doing in the late 1990s helping through training exercises on how carbon markets would work.

I have personally gone on missions to places, faraway places, like Colombia and Ecuador, where I sat down with a group of people that have a spark of interest in this market, largely because of those programs that were in place back in the 1990s. I particularly remember going into those two countries—this is 2 or 3 years ago—and probably two out of three of the project proposals that local companies brought forward were forestry projects, which we could not buy because we could not resell them in the European carbon market.

It is a great thing to create that capacity, but it really only works, as again Ambassador Eizenstat has set forth, if there is a clear policy signal that these credits are going to be good for compliance in a carbon market somewhere. Therefore, go forth and multiply. And I really do hope that the U.S. Federal legislation has an openness to forest protection projects, because I think it can stimulate a huge amount of activity globally.

Senator MENENDEZ. Last two questions. Dr. Gurney, if I gave you a magic wand and you could move the science forward, what would it take? Give me some sense of magnitude of what it would take for a greater ability to be able to quantify the values here. I know that is very unscientific, but I wanted to draw you out of the box for a moment and see if I——

Dr. GURNEY. The thing that is probably the most effective place to expand resources at this point is, again, probably in-country capacity. By that, I mean country exchanges of scientific knowledge. The tropical forested countries are in some ways relatively unknown in terms of biomass content, spatial variability. There has been work in the last few years that more and more is going into tropical forest countries from the industrial scientific community, but we need partners in-country. That has probably been one of the biggest barriers to doing effective work there.

Consistency. Of course, a lot of this goes back to things like governance, which I am not an expert at, but I can certainly, as an observer from the outside, recognize that that is often a difficulty. I will give you a quick anecdote. One of the problems we have had in doing work in some tropical countries is just simply getting instruments in-country. Bringing them across the border effectively becomes an enormous barrier sometimes and a big slowdown.

So probably the first thing I would do is probably build up in-country capacity, scientific exchange, development of infrastructure within countries like Brazil, Indonesia, Malaysia, places where tropical deforestation is moving forward at a rapid pace, install

more monitoring and measurement equipment, the ability to fly aircraft over countries. As I said, satellite remote sensing technology is moving forward because it is mainly pushed by the industrial world, although we need in-country capacity to be able to use and analyze that satellite information.

Senator MENENDEZ. That is very helpful.

I have a vote going on and we have to get to the floor.

You have all referred to commodity prices. Certainly there has been in recent months reports of soaring food prices worldwide, and many place the blame on biofuel mandates and some have said that biofuel demand has been blamed for increased rates of deforestation in Indonesia and Brazil. And some studies have concluded that even incredibly efficient biofuel such as ethanol from sugar cane could actually be worse for global warming because of the emissions growth associated with deforestation.

Is this a cause for concern; something to look at? Is it a time for a pause, or do we just let this ride?

Ambassador EIZENSTAT. It is an excellent question. First of all, on the magic wand, my magic wand would be to get 60 votes for Lieberman-Warner with forestry credits.

Ag conversion is one of the key drivers of deforestation, and as I have mentioned, with rising commodity prices, there is increasing pressure to convert land. On the biofuels mandate that is in both the U.S. and EU legislation, it does put additional pressure on prices. It is estimated that about 15 to 20 percent of rising food prices come from this and therefore increased pressure for conversion or tropical forests for ag production.

This is, again, another reason, however, to place the value on the carbon stored in tropical forests so there is a counterweight against the economic forces of rising ag commodity prices.

On biofuels policy, it should include full carbon accounting, taking account of the carbon emissions associated with land conversion. The renewable fuels standard, which is part of the 2007 Energy Independence and Security Act, does require the administrator to take into account carbon emissions associated with land use in the production of biofuels to determine whether specific biofuels meet the mission reduction thresholds. I think this is important so that we have a real picture of what actually is being produced in terms of emission reductions or, indeed, increases by biofuels mandates. So I think Congress has taken that step and we need to get those results as quickly as possible.

Senator MENENDEZ. Thank you all for your testimony today. I think it is a great opening to what will be a series of hearings that the committee and the subcommittee will be holding on a post-2012 climate change treaty and the things that we need to consider, particularly in this case, tropical forests.

The record will remain open for 2 days so that committee members may submit additional questions to the witnesses. Certainly if you receive those, we would ask you to respond expeditiously to them. We thank you again for your insights.

Much reference has been made to the New York Times article. I ask unanimous consent that it be included in the record. Without objection, so ordered.

[The Times article referred to follows:]

[From the New York Times, Apr. 19, 2008]

WITH GUNS AND FINES, BRAZIL TAKES ON LOGGERS

(By Alexei Barrionuevo)

ALTA FLORESTA, BRAZIL.—A convoy of six black sport utility vehicles pulled into a lumberyard unannounced here one recent morning. Out popped about two dozen members of Brazil's security and police forces, packing sidearms and rifles. But the weapon the foreman feared most was carried by a separate group of agents of Brazil's national environmental agency: Bright yellow tape measures.

"Thirty-eight! Seventy!" the agents shouted from the logs clustered in the thick mud as they quickly went to work. One agent, Mario Rubbo, jotted down the volume of each log for comparison with what the lumberyard had declared to state authorities. Discrepancies could mean fines or criminal charges.

This is Operation Arc of Fire, the Brazilian government's tough campaign to deter illegal destruction of the Amazon forest. It is intended to send a message that the government is serious about protecting the world's largest remaining rain forest, but so far it has stirred controversy for its militaristic approach to saving trees, and the initial results have been less than promising.

The operation began in February after new satellite data showed that deforestation had spiked in the second half of 2007 after three consecutive years of declines. The new data rattled the government of President Luiz Inácio Lula da Silva, which has been trying to play a bigger role in discussions about global climate change amid mounting scientific evidence that some 20 percent of annual global greenhouse emissions come from the clearing of tropical forests, including the burning, decay and decomposition of the land.

The government says it will now spend $118 million over at least the next year to crack down on illegal loggers. It has mobilized some 600 officials in three states—Mato Grosso, Pará and Rondonia—as well as 175 cars and trucks and four airplanes. In the operation's first few days, the police discovered hidden troves of wood, sometimes underground and invisible from the air.

Already, the authorities have issued $25.9 million in fines, made 19 arrests and seized more than 51,140 cubic yards of wood, which has been transferred to local governments, said Kézia Macedo, an analyst with the federal environmental agency, known as Ibama, in Brasília.

But the challenges are daunting. The Amazon is vast, with some 1.3 million square miles still forested. The 48 police officers and two dozen environmental agents involved in Arc of Fire here seem minuscule for the territory in northern Mato Grosso.

That is one reason the agents are mostly concentrating on bottlenecks where the wood must be transported, catching loggers coming in and out of Alta Floresta, a city of about 50,000 people in northern Mato Grosso.

The federal government has tried such police operations before, notably in early 2005. But those efforts were only sporadic. This time government officials say they plan to establish permanent operations in the region to control the exit of wood from the forest, and keep pressure on the loggers.

Tensions were high in the first few days of the program in Tâilandia, a city in Pará State, where loggers joined local officials to protest and harass agents involved in the operations.

Here in Mato Grosso, Brazil's giant agricultural state where the most deforestation has occurred, Ibama agents are confronting a powerful governor, Blairo Maggi, the world's largest soybean producer, known in Brazil simply as the "King of Soy." While Governor Maggi has softened his public stance the past few years on deforestation, he remains a forceful advocate for agricultural expansion.

He has reportedly sought meetings with Mr. da Silva in recent days to discuss Arc of Fire. Ibama agents privately suggest that Governor Maggi exerts a strong influence over Mato Grosso's state environmental agency. The state officials have successfully challenged Ibama's method of measuring wood volumes and criticized the deforestation-detection system of Brazil's National Institute for Space Research.

Both the federal and state environmental agencies have struggled with accusations of corruption. In 2005, Governor Maggi fired his environmental secretary after he was charged with bribery, though the charges were never proved. In Alta Floresta, the Ibama agents are led by Rodrigo Almeida, a former travel agent who has been with Ibama for 14 years. They try to maintain a low profile and declined to have their faces photographed for fear of being singled out for intimidation. "For sure, there are a lot of interests involved in these operations," said Glauco Saraiva, the Federal Police chief who is in charge of Arc of Fire here.

After averaging 7,700 square miles a year in the 1990s, deforestation in Brazil had slowed to 4,200 square miles a year in 2006, before increasing again last year. From August to February an average of 270 square miles was deforested a month, according to the National Institute for Space Research.

It is tough to say if the agents are managing yet to turn back the trend. In the operation's first month, February, deforestation in Brazil rose another 13 percent over January, some 88 percent of it in Mato Grosso, the space research institute reported.

Mr. Almeida, 35, said the alarming increase underscored the need for the government's campaign. In Alta Floresta, Lindomar Della Justina, the president of the local logging syndicate, said Ibama agents were waging a losing battle. "If you paralyze activity here, will that stop the deforestation?" he asked. "It won't stop it."

Mr. Rubbo, the Ibama agent, essentially agreed. "I am playing a game we are fated to lose," he said one afternoon. "The game is 12 to 1 against us and there are two minutes to turn it around. But I just try to do my part here."

Local industry officials like Mr. Justina are not happy. They say Arc of Fire is stifling commerce in an industrious town that answered the call of the military government in the 1970s for Brazilians to colonize the Amazon before foreigners did. "This strategy to put handcuffs on us is killing our morale," said Vicente da Riva, the president of Alta Floresta's rural association.

At the Ibama headquarters here, agents study satellite data from the space institute and Google Earth on computers. A large green parrot occasionally squawks from the roof next to the dining table where agents are briefed on their missions.

A call came one morning at 9. A truck suspected of carrying illegal wood was caught on the road into town. Three Ibama agents were dispatched to the Federal Police headquarters where the truck had been impounded.

Once there, one agent, Otaciano Matos, pulled a tape measure from his burgundy briefcase. He quickly declared it an open-and-shut matter: The truck had no license plate and the driver had no documentation proving the wood's origin or destination. "Illegal wood," he said simply.

Later that night a group of five Ibama agents drove eight miles out of town on a midnight "blitz." Mr. Almeida, the Ibama leader, wearing a knit ski cap to guard against mosquitoes, explained that agents had caught several trucks at this spot where two dirt roads merge into the main highway into town.

Illegal loggers prefer to travel deep in the night, he said. With moonlight forcing its way through the clouds, the agents gathered in a circle and smoked cigarettes and traded stories about their hometowns.

"Rodrigo, are we are doing the right thing?" asked Paulo Iribarrem, a burly 17-year Ibama veteran, breaking a momentary silence.

"Don't worry, pal, this is just the first stage of the operation," Mr. Almeida replied. "There is more to come."

The agents stopped one passenger car, and a motorcycle or two passed by. But after nearly two hours, with no trucks hauling wood, they called it quits and headed home.

[Mery Galanternick contributed reporting from Rio de Janeiro.]

Senator MENENDEZ. And with that, the hearing is adjourned.

[Whereupon, at 12:07 p.m., the hearing was adjourned.]

ADDITIONAL STATEMENTS SUBMITTED FOR THE RECORD

PREPARED STATEMENT OF HON. JOSEPH R. BIDEN, JR., U.S. SENATOR FROM DELAWARE

I thank Senator Menendez for convening this important hearing on deforestation issues. It is through forests that our planet breathes. Over their life cycles, trees absorb carbon dioxide; when they die, they release it. Preserving and adding to our forest cover can compensate for our industrial carbon dioxide emissions. Cutting forests removes that protection and adds to the global buildup of greenhouse gases that are the driving force of climate change.

That is why forests are now a key feature of international climate change negotiations. Nations with significant forest cover have an asset that helps the whole planet in the long-term fight against global warming. But those same forest assets are worth money today. For many of those nations, with tens of millions of people to feed, the economics are compelling—cutting and selling those trees for short term economic gain beats preserving them for long-term global benefits.

We must change that equation. We must make preserving and restoring forests profitable—not just for the rest of the world, but for those countries, too. The basics of the tradeoff are clear. In the simplest case, protecting forests can offset emissions from industrial activities. If we make it costly for industries to emit carbon dioxide, we can make it profitable for them to pay for the protection of forests that help to compensate for those emissions.

But we have a long way to go before that simple transaction can become part of the global effort to slow, stop, and reverse the increase in the concentration of greenhouse gases that threaten our climate. We will need a domestic cap-and-trade system that is part of a wider global carbon trading system. We will need an international system of measurement and verification for that trading system to work. We will need to build the technical capacity in developing countries, and the financial markets in developed countries, to bring buyers and sellers together.

If we succeed, there will be many additional benefits. Tropical rainforests—our richest carbon sinks—are also our richest harbors of biodiversity. They are the sources of life-saving drugs, they protect against floods and the erosion of agricultural lands, and they are crucial to both fresh and saltwater fishing. I'm proud to have authored, with Senator Lugar, debt-for-nature swaps through the Tropical Forest Conservation Act. We have written a reauthorization of that successful program again this year, and I hope we can finally get it passed and signed into law. In the past 10 years, this legislation has protected 47 million acres of vital tropical habitat.

This hearing is exactly what I hoped to see when Senator Lugar and I encouraged committee members to focus their energies and attention on climate change. The United States continues to participate in international negotiations on a post-2012 climate agreement. As those discussions go forward, this committee must keep pace with those discussions. We must make sure that the Senate itself will be prepared to give informed consideration to any international agreement that may be reached. The United States, the largest historical source of the greenhouse gases now in the atmosphere, is essential to that process. We, as a nation, must be prepared to lead in the search for a global response.

Today's witnesses bring broad expertise. Ambassador Eizenstat has a distinguished career in public service, and today in private practice continues to contribute to important international debates, from climate change to Holocaust reparations. He was the lead U.S. negotiator in Kyoto and thus knows the process and the policy intimately. He is joined today by former Deputy Secretary Hayes who spent his time at the Department of Interior working on many closely related issues. Dr. Kevin Gurney from Purdue University is a leader on the measurement and verification that will prove essential to make any deforestation deal work. Dirk Forrister represents the carbon traders who deal with carbon on trading markets day in and day out and has also been part of our country's official climate change negotiating team.

I hope that this hearing will bring some much needed focus to questions of deforestation. As much as one-fifth of human carbon emissions are from deforestation and land use changes—more than the entire global transportation sector. That means every car, bus, train, airplane in the world. We can't solve this problem without taking into account the role of forests.

Again, I thank Senator Menendez for convening this hearing and for his intention to hold a series of hearings exploring the challenges and opportunities of a post-2012 climate framework. The science is clear that climate change must be addressed, and that it must be addressed now, and I hope these hearings and other committee efforts will advance our understanding of the role that the United States can and will play in the coming years.

PREPARED STATEMENT OF HON. CHUCK HAGEL, U.S. SENATOR FROM NEBRASKA

Chairman Menendez, thank you for holding this hearing on the important issue of preventing deforestation as part of an international climate change agreement. Thank you also to our witnesses: My friend, former Ambassador Stuart E. Eizenstat, on behalf of Sustainable Forestry Management; Professor Kevin Gurney, Associate Director of the Purdue Climate Change Research Center; David Hayes, former Deputy Secretary of Interior in the Clinton administration; and Dirk Forrister, Managing Director of Natsource LLC.

This year, both Congress and the International Community are working to craft a realistic approach to mitigating climate change that is truly global in nature. A workable international treaty for dealing with climate change must be a diplomatic priority.

The "Bali Roadmap" on climate change negotiations has provided the outline for negotiations on a successor treaty to the flawed Kyoto Protocol. I am encouraged that the roadmap calls for a truly global treaty that will ask for commitments from all nations, which is consistent with the Byrd-Hagel Senate resolution that passed by a vote of 95–0 in 1997.

Global climate change concerns us all. It does not recognize national boundaries. It does not discriminate between rich and poor people or industrialized and developing nations. Dealing with it is a shared responsibility for all people and all nations. Today's hearing focuses on an often overlooked source of greenhouse gas emissions: The carbon released by the clearing and burning of tropical forests.

Today, tropical forest is vanishing at a rate of 5 percent a decade, wrecking habitats, harming biodiversity, and releasing approximately 3 billion tons of carbon dioxide a year. The destruction of tropical forests has been estimated to cause 20 percent of the yearly global release of greenhouse emissions. We cannot simply ignore these emissions and pretend that all greenhouse gas emissions come from power plants—a global treaty must comprehensively deal with all sources of emissions.

If international greenhouse gas emissions statistics included emissions from deforestation, Indonesia and Brazil would become the world's third- and fourth-largest emitters (behind the United States and China), respectively. Together, Brazil and Indonesia contain almost 35 percent of the world's tropical forests. Since 1990, these nations have lost 11 percent of their forest cover.

Protecting tropical forests is an issue that affects the environmental and economic health of nations around the world, not only those in the tropics. We must responsibly address climate change with a comprehensive international strategy that incorporates economic, environmental, and energy priorities. Efforts to protect the world's forests are an important part of the Bali Roadmap, and a global agreement should recognize the environmental and economic benefit these forests hold, when they remain intact.

The Kyoto Protocol created perverse incentives regarding the protection of forests that a new treaty will have to correct. For example, under Kyoto, there are financial rewards for capturing and storing carbon in forests—but only if nations plant new forests, or regrow old forests that have been clear-cut. There is no mechanism to protect old-growth forests—which science has shown sequester the greatest amounts of carbon.

Global climate policy will require a level of diplomatic intensity and coordination worthy of the magnitude of the challenge. America has an opportunity and a responsibility for global climate policy leadership. But it is a responsibility to be shared by all nations. If we address forestry protection in a rational, manageable, and verifiable way, this will help bring a comprehensive U.N. sponsored international deal closer to reality.

Thank you again, and I look forward to the testimony of our witnesses.

PREPARED STATEMENT OF JACQUELINE SCHAFER, ASSISTANT ADMINISTRATOR FOR ECONOMIC GROWTH, AGRICULTURE AND TRADE, U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT, WASHINGTON, DC

Mr. Chairman, I appreciate the opportunity to submit a statement for the record on this important topic. We are eager to highlight how our Government and our team at the U.S. Agency for International Development (USAID) work to address international deforestation and climate change. This cross-cutting issue brings together collaboration of many offices in the Bureau for Economic Growth, Agriculture and Trade, which I head as Assistant Administrator. I am proud of the work of the United States on this issue and honored that the many people around the world working for USAID contribute to addressing international deforestation and climate change.

Tropical forests are critical to the survival and well-being of people around the world. For example, many people depend on forests for food, shelter, income, medicine, and clean water. In addition, tropical forests harbor some of the world's unique and critically endangered biodiversity, for example at least 120 important drugs currently in use were originally derived from naturally occurring plant species. Forests help mitigate climate change by storing carbon in vegetation and soils. Forests also provide other services, such as regulating water quality and quantity by slowing the runoff of rainwater, improving infiltration of water into soils, and filtering water as it flows to streams and aquifers. This helps provide safe and reliable water sources to surrounding communities. Healthy forests enable surrounding communities to be resilient to economic and environmental shocks such as drought. Forests and biodiversity are also important to many people for their spiritual and aesthetic values.

Unfortunately, tropical forests face a number of threats, including conversion to agriculture, illegal logging, unsustainable extraction of timber and other forest resources, climate change, pollution, and policies that subsidize forest conversion to other uses. Deforestation is a significant contributor to climate change: Scientific studies have estimated that 20 percent of global greenhouse gas emissions are attributable to deforestation. Each year, approximately 10.4 million hectares of forest are lost. To put this into perspective, that is equivalent to losing an area roughly the size of Virginia each year. The World Bank estimates that illegal logging represents a loss of $10–$15 billion per year to developing countries. Illegal logging also fuels corruption and in some countries finances conflict. Loss of forest cover, riparian buffers and mangroves also represent a significant increase in regional and local vulnerability to climate variability and climate change.

To address these concerns and to ensure that forests and biodiversity continue to play an important role in sustainable development, USAID supports programs around the globe that aim to improve the conservation and sustainable management of forests and biodiversity.

In order to address the societal context in which deforestation occurs, it is important to have an integrated response that includes promoting sustainable economic development, alleviating poverty, strengthening forest governance, and conserving biodiversity. USAID works in partnership with recipient countries, NGOs, and other partners on many fronts. The goal is to first empower local communities. Local populations are the most immediate custodians in the management of tropical forests, and USAID recognizes that engaging these users is critical to sustainably managing and protecting those forests. Second, we aim to improve forest policy. We work with host country governments to establish favorable forest management laws and policies, ensure transparency and stakeholder participation, and build capacity to implement those policies. Third we promote sustainable practices. We help establish sustainable forest management practices in forest enterprises. Fourth, we coordinate efforts across borders. Important tropical forests often cross political boundaries; we support programs that work across borders to promote effective large-scale forest conservation. And finally, we make it a priority to involve the private sector. Through public private partnerships, USAID successfully leverages private sector financing and commitments to facilitate legal and transparent trade of forest products derived from legitimate operators and well managed forests. By forging partnerships that function at local, national, and international levels, the U.S. Government is implementing a wide range of effective initiatives and programs that reduce deforestation and associated greenhouse gas emissions while also supporting sustainable development goals.

I would like to highlight for the committee some of the key U.S. efforts in this area. As reported in our most recent performance report, USAID supports sustainable forest management and conservation around the globe, investing approximately $85 million in tropical forest activities from all funding accounts in FY 2006.[1] These investments led to significant accomplishments in Africa, Asia, the Near East, Latin America, and the Caribbean. In addition, the Tropical Forest Conservation Act program receives an annual budget of $20 million per year allocated to the Debt Restructuring Account (DR) in Treasury in which USAID plays a key management role. In 2006, $27 million from this account leveraged $42.7 million for forest conservation through local NGOs and community groups.

Activities I would like to highlight include:

The President's Initiative Against Illegal Logging (PIAIL) assists developing countries in their efforts to combat illegal logging in the key tropical forest regions of the Congo Basin, the Amazon Basin and Central America, and South and Southeast Asia. In Africa, PIAIL works through the Congo Basin Forest Partnership (CBFP) and USAID's Central African Regional Program for the Environment (CARPE) to reduce the rate of forest degradation and biodiversity loss in Cameroon, Central African Republic, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, the Republic of Congo, Burundi, Rwanda, and Sao Tome. CARPE supports a network of national parks and protected areas, improves management of forestry concessions, and assists forest communities. Residents of the Lac Télé Community Reserve in the Republic of Congo created natural resource management committees who mapped development, buffer, and protected areas, and mounted community patrols in protected areas. By allowing local communities to make their own resource use decisions, the communities were able to return to the customs of their ancestors, regulate use by nonlocals, and resolve conflicts between both families and villages.

[1] This testimony contains performance results from the report: "Foreign Assistance Act Section 118: Tropical Forests, FY 2006." Results from FY 2007 are currently being collected and will be presented in the FY 2007 Section 118 report.

In February 2005, Central African heads of state signed a treaty to coordinate protection and management of the regional tropical forest resources. The treaty was followed by a Presidential decree to regulate logging concessions in the DRC and an agreement between Cameroon, Gabon, and the Republic of Congo to implement landscape and wildlife management plans for the Dja-Minkebe-Odzala Tri-National Landscape. The CARPE program will improve the management of over 200 million hectares of forest.

Tropical Forest Conservation Act (TFCA) agreements are offered to eligible developing countries to relieve certain forms of official debt owed to the United States Government while simultaneously generating funds for forest conservation activities. The TFCA is an interagency program led and jointly managed by State, USAID, and Treasury. As of December 2007, approximately $95 million in congressionally appropriated funds have been used to conclude TFCA agreements with Bangladesh, Belize, Botswana, Colombia, Costa Rica, El Salvador, Guatemala, Jamaica, Panama (two agreements), Paraguay, Peru, and the Philippines. The local funds created under these programs will together generate more than $163 million for grants and projects over time to help protect and sustainably manage tropical forests in beneficiary countries.

The Liberia Forest Initiative (LFI) was created in early 2004 to support the rehabilitation and reform of the Liberian forestry sector and to ensure forest resources are used for the benefit of the Liberian people. Programs under LFI are jointly implemented by the U.S. State Department, U.S. Forest Service, USAID and the U.S. Treasury Department together with nongovernmental organizations such as Conservation International and the Environmental Law Institute. The initial 2 years of LFI focused on helping Liberia reform the process of allocating and managing forest concessions so that the U.N. would remove timber sanctions. Sanctions were lifted in early 2006 after the new democratically elected government developed and initiated a transparent concession process. The Liberian Parliament has passed a new forestry law supporting a policy of increased transparency in forest management, greater community involvement, more equitable access to forest resources, and improved forest conservation. Successful implementation of these policies promises to reduce illegal and unsustainable logging and improve management of Liberia's approximately 4 million hectares of forests.

For the past 15 years, USAID has worked closely with Madagascar to protect its exceptional biodiversity and forest ecosystems while addressing its significant poverty though our Madagascar Environment and Rural Development program. In 2005, the President of Madagascar announced his goal of tripling the size of the country's protected area network. Working with the Government of Madagascar, USAID helped to achieve this goal by assisting in the development of a framework and a participatory process that guided the creation of 13 new protected areas. The U.S. Government also helped to ensure the long-term viability of the protected areas by establishing the Protected Areas and Biodiversity Trust Fund with an initial capital investment of $4 million from three founding donors—the Government of Madagascar, WWF, and Conservation International. To reduce slash-and-burn agriculture and to address rural poverty, USAID continues its work to introduce improved agricultural techniques, to encourage the transfer of natural resources management to local communities and to link producers to markets. In addition, USAID and the U.S. Forest Service have helped the Malagasy Forest Service develop a far-reaching strategy for institutional reforms, a competitive forest permit bidding system, and a forest zoning process that balances conservation and production needs. U.S. Government investments benefit over 13 million hectares of forest in Madagascar.

In Indonesia USAID works through The Nature Conservancy (TNC)—World Wildlife Fund (WWF) Alliance to Promote Forest Certification and Control Illegal Logging. This Alliance has created a comprehensive legality standard and timber-tracking system for wood products, allowing purchasers to differentiate legal and illegal timber. In addition, the Alliance has helped directly improve forest management. For example, WWF helped two new companies carry out baseline assessments and devise an action plan to achieve forest certification. As a result, over 200,000 hectares of forest will be under improved management. Through this Alliance, USAID has helped improve the management of nearly 1.2 million hectares of forest in Indonesia. USAID also protects endangered orangutans and their habitat through community and local government participation. Grants have been given to the Orangutan Foundation International, The Nature Conservancy, World Education and Conservation International to work on the islands of Borneo and Sumatra. A major focus includes conducting forest patrols, training park officials, and using Geographic Information Systems (GIS) to help monitor and manage Tanjung Puting National Park. Additionally a 38,000 hectare former logging concession has been

handed over to and managed by indigenous Dayak communities for forest and orangutan conservation.

Leveraging expertise and funding from private sector partners like Johnson & Johnson, TetraPak, Home Depot, Gibson Guitars, and Ikea, the Sustainable Forest Products Global Alliance (SFPGA) between USAID, Metafore, WWF and the worldwide membership of the Global Forest Trade Network is working as a public-private partnership to increase the demand for products made from sustainably managed forests. This is improving the economic viability of sustainable forestry. In Africa, SFPGA works in a number of countries to foster sustainable forest management. In Cameroon, WWF's Central Africa Forest & Trade Network obtained commitments from logging companies to help develop sustainable forestry systems by assisting the formation of village forest committees to provide input into local forest concession management. In Ghana, the Forest and Trade Network has achieved similar participation from the forest industry, leading to a recent conference that developed management prescriptions for High Conservation Value Forests, a key step in obtaining forest certification.

The long-term goal of USAID's forestry program in Brazil is to significantly increase the area of the Brazilian Amazon under sustainable forest management, reconciling the desire for economic growth with the need for healthy, working forests. USAID's partners provide training in forest auditing procedures and forest management techniques and a major opportunity exists to support the newly established Brazilian Forest Service by expanding on the longstanding relationship between USAID, the Brazilian Ministry of Environment, and the USDA Forest Service. USAID has helped place an additional 1.4 million hectares of natural forest under sustainable management in the Brazilian Amazon. With technical assistance from USAID partners, Conservation International and Instituto Raoni, Brazil also achieved the largest area of certified tropical forest in the world: An area of 1.5 million hectares of Amazonian forest has been certified for sustainable extraction of Brazil nuts by Kayapo indigenous communities in southern Para State. To date, nearly 3 million hectares of forest are under management plans or are certified for sustainable extraction. Nearly 3,900 people were trained in sound forest management techniques in FY 2006 and nearly 10,000 more were taught best practices, including fire management and land use planning.

Mr. Chairman, USAID is dedicated to applying our experience in the design of programs going forward. The long-term success of USAID's development programs will depend upon how climate change is considered in planning and implementation. We will work with nations to adapt to the impacts of climate change, strengthen resilience, disseminate tools and methodologies to improve vulnerability and adaptation assessments, and integrate adaptation into development. By incorporating—mainstreaming—climate change into existing priority programs, development success becomes more robust when viewed in the long term.

In response to the May 31, 2007, speech by President Bush on climate change, USAID requested an increase in climate change specific funding in the President's FY09 budget. The bulk of these efforts will add to the extensive forest conservation and biodiversity programs at the Agency, and will create new efforts to support adaptation efforts in development assistance. The activities will contribute to an improved global environment through climate change mitigation and adaptation while at the same time contributing to poverty alleviation and economic growth in countries USAID serves.

Activities in the forest sector address forests and climate change strategically. Our programs work to reduce CO_2 emissions from deforestation, promoting sustainable forest management and forest conservation, and increase CO_2 sequestration through reforestation. Activities seek the significant cobenefits of economic development and improved livelihoods that come from local economies that are diversified through productive integration of trees in agricultural lands, and sustainable use of existing forests. Reforestation is a way to accomplish economic development, increase food security, meet energy needs, provide environmental services like improved water supply, and reduce sources of conflict.

Healthy forests also help buffer against future climate changes and increased weather variability. Sustainable forest management can help communities' resilience to changing temperature regimes, precipitation patterns and runoff. Sustainable forests help maintain water table levels, continue local precipitation patterns, provide buffers for flooding, and absorb heavy rains. There are a number of key elements to USAID's proposed FY09 program. USAID will manage four regional forest conservation/sustainable forest management programs (CBFP, ICAA, Asia, West Africa) covering heavily forested areas of the tropics and subtropics in the developing world. We will continue country-based biodiversity programs addressing the identified biodiversity hotspots, their relationship as habitat for endangered species,

and alternative livelihoods and economic growth for the local people. USAID will create targeted reforestation programs to increase forest cover in areas concerned with degraded lands, impacts from extreme weather events, desertification, water harvesting, and drought resilience. And finally USAID will invest in sustainable efforts that help developing countries meet their own energy demands domestically while providing for food security and improved livelihoods of people.

In closing, Mr. Chairman, forests were once seen simply as an important economic asset: A source of timber and game, or land for conversion to agriculture. Now we know the importance of forests and biodiversity in other roles. They regulate water supplies; they provide nontimber assets including tourism, biodiversity, and culture; and they influence the global climate and carbon cycles.

Deforestation is understood to be a threat to biodiversity and also to watersheds, livelihoods, and indigenous people—illegal logging represents a significant lost asset to the country. We now know that deforestation is a significant contributor to global GHG emissions, thus reducing deforestation is essential for reducing or offsetting emissions. Deforestation also increases vulnerability to climate change, at the site and downstream—changing precipitation patterns, water retention, water quality, increasing run off especially in extreme events—but also results in a lost economic backstop, the "supermarket of last resort."

As such, USAID will continue to address forests and biodiversity management as part of an integrated response to address the drivers of deforestation. This response includes promoting sustainable economic development, alleviating poverty, strengthening forest governance, and conserving biodiversity, while incorporating climate change mitigation and adaptation approaches to apply science to reach sustainable and enduring development outcomes.