

Importantly, the offset aggregator should be a public entity (or at least have a public charter). While a private sector aggregator would probably emerge in the absence of a government entity (indeed, such entities are already in existence in the voluntary carbon markets), only a public entity would direct 100 percent of the savings into lowering costs for regulated companies and securing the maximum emissions mitigation by developing nations for every dollar spent. In contrast, a private sector aggregator would likely try to maximize its profits by retaining for itself as much as possible between the price companies would be willing to pay and the lower price it negotiates with developing nations. In addition,

a government entity may be needed to finance emission reductions from Brazil and other nations that may choose not to participate in U.S. carbon markets, or to engage other categories of nations that fail to attract private capital. A government-based forest carbon offset aggregator also would be well-positioned to ensure the environmental integrity of offsets entering the United States. With the government verifying emission reductions and monitoring implementation, moreover, U.S. companies could avoid exposure to the reputation and business risks associated with tropical forest sector investments in faraway regions about which they may have very little information.

# Climate Change and Tropical Forests

## A Global Challenge

Climate change is a serious and urgent threat to the United States and the world, and its adverse impacts are already being felt at home and abroad (see Figure 1). Future climate threats to the United States include more common and intense hurricanes, floods and droughts, increased risk of death from extreme heat, epidemics of pests and diseases, and decreased crop yields with high levels of warming. Some of these impacts will be much more severe in certain regions, including flooding in the Southeast and changing precipitation patterns in the Southwest.<sup>1</sup> Internationally, climate change acts as a “threat multiplier” against U.S. national security and humanitarian interests.<sup>2</sup> Climate-induced floods may impact as many as 94 million people by the end of the century and result in large population migrations. By 2020, 75-250 million people may face climate-related water shortages, with Africa suffering disproportionately. In some African countries, yields from rain-fed agriculture could be reduced by up to 50 percent over the same period. As a consequence of these climate impacts up to one billion people risk falling back into extreme poverty, with serious implications for the United States and the world in the form of humanitarian crises,



natural resource competition, armed conflict and even state failure.<sup>3</sup> Inaction now will only increase the threats the United States must face later and reduce its ability to manage those threats. Acting now to substantially reduce domestic emissions is essential given America’s strategic global role, its contributions to the climate problem and the increasing risk of catastrophic climate impacts. But domestic action alone will not suffice—half of global emissions come from developing nations and those countries are expected to account for nearly all

of the expected 45 percent growth in global emissions by 2030. Reducing emissions in developing nations will require new forms of international cooperation, because many developing countries lack the means and the financial and political incentives to act.

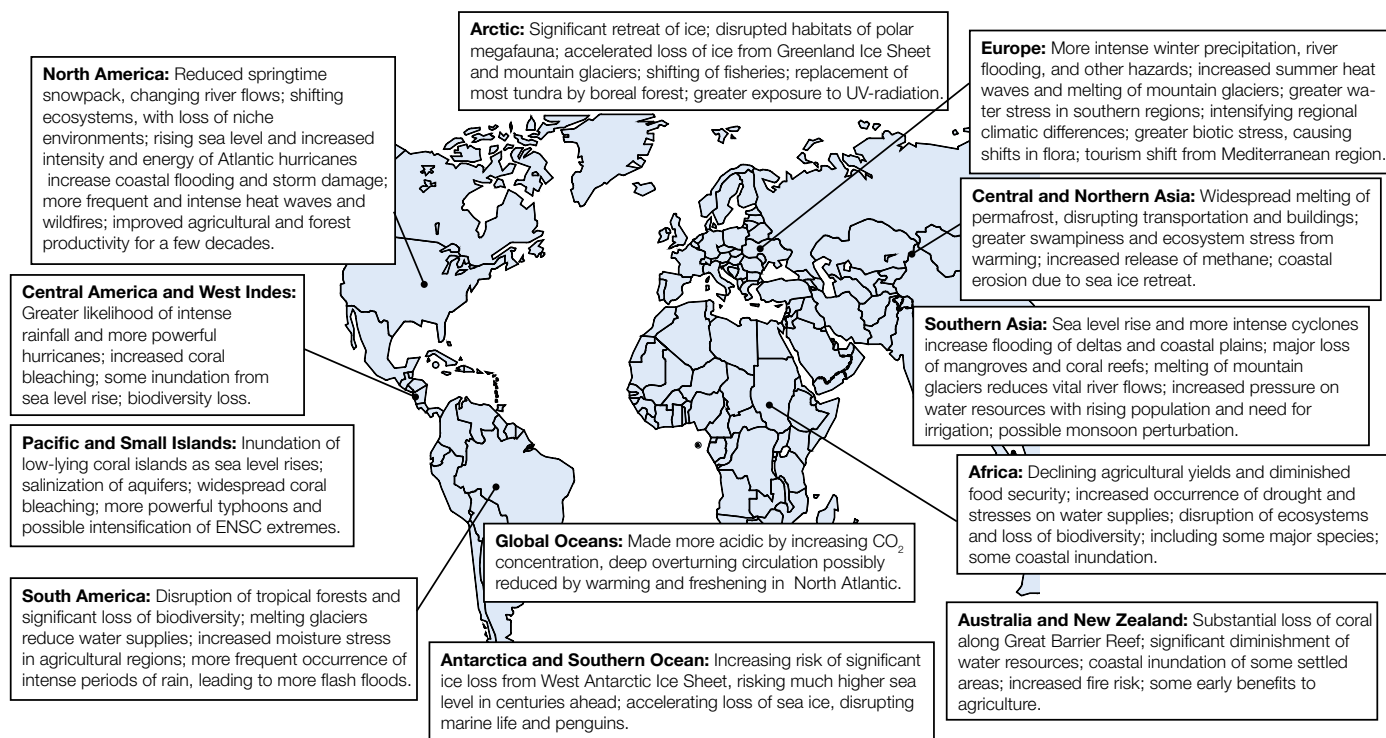
Inaction now will only increase the threats the United States must face later and reduce its ability to manage those threats. Acting now to substantially reduce domestic emissions is essential given America's strategic global role, its contributions to the climate problem, and the increasing risk of catastrophic climate impacts. But domestic action alone will not suffice—half of global emissions come from developing nations, and those countries are expected to account for nearly all of the expected 45 percent growth in global emissions by 2030.<sup>4</sup> Reducing emissions in developing nations will require new forms of international cooperation; because many developing countries lack the means and the financial and political incentives to act.

**Commissioner Perspective:**  
**CHUCK HAGEL**

Former United States Senator, Nebraska

“Although the bulk of our planet’s tropical forests are found on foreign shores, the effects of deforestation transcend national borders, increasing the pace and severity of global warming worldwide. Tropical deforestation is a major element of the climate threat and requires our immediate attention, as any other global crisis would. It is clearly in our national interest – economic, foreign policy, national security and beyond – to confront this threat. As the world’s largest economy and most powerful nation, we must work closely with our allies in both the developed and developing worlds to cut tropical deforestation in half within a decade. We have helped the world face potentially catastrophic threats before. We must heed the call to do so again.”

**Figure 1: Impacts of Climate Change Around the World**



Source: Adapted from Scientific Expert Group on Climate Change (SEG) (2007) *Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable* [Rosina M. Bierbaum, John P. Holdren, Michael C. MacCracken, Richard H. Moss, and Peter H. Raven (eds.)]. Report prepared for the United Nations Commission on Sustainable Development, Research Triangle Park, NC, Sigma Xi, and Washington, DC, the United Nations Foundation.

*Finding: Climate change is a major and growing threat to the United States and the world.*

**Recommendation: The United States should adopt strong domestic climate change laws that reduce U.S. emissions 80 percent by 2050 and contain interim goals consistent with climate science, thereby helping to galvanize ambitious international action.** In July 2009, during the Group of Eight (G8) and Major Economies Forum (MEF) meetings, world leaders endorsed the consensus scientific view that global average temperature increases ought not to exceed 3.6° Fahrenheit (2 degrees Celsius) above pre-industrial levels in order to avoid unacceptable climate risks.<sup>5</sup>

*Finding: The consensus scientific view is that global average temperature increases ought not to exceed 3.6 degrees Fahrenheit (2 degrees Celsius) above pre-industrial levels in order to avoid unacceptable climate risks.*

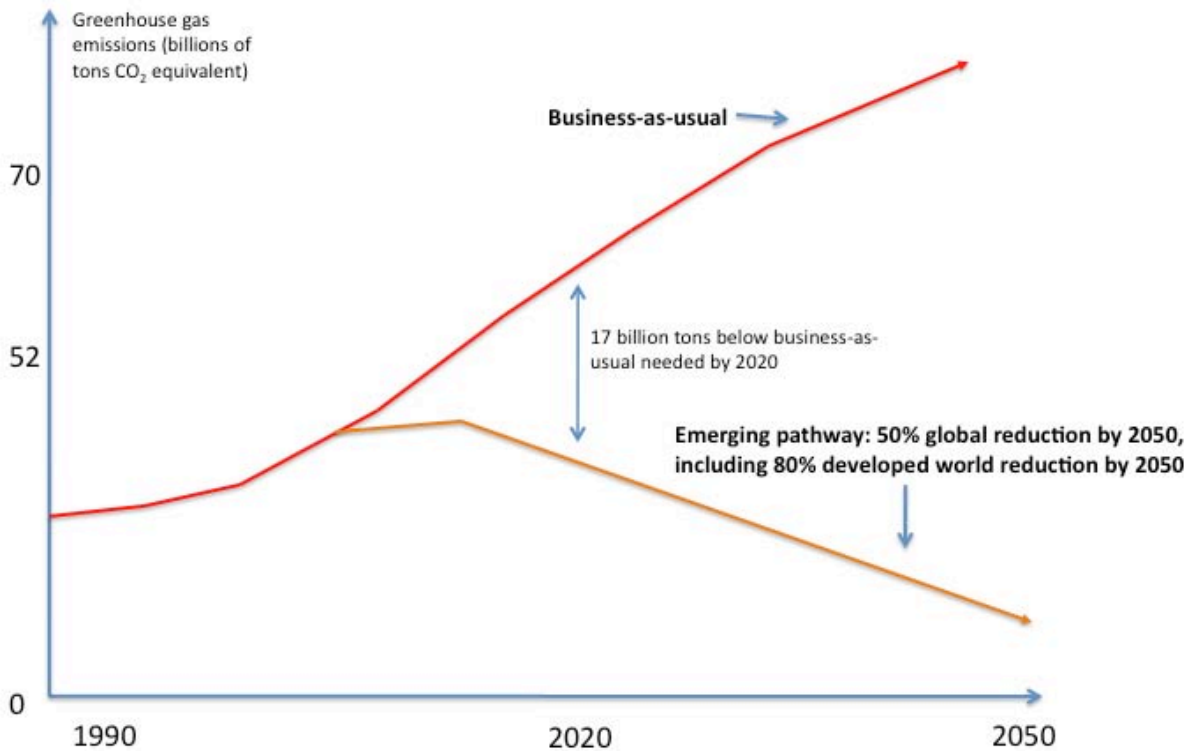
Achieving this goal will require reducing global emissions by 50 percent by 2050, with industrialized nations reducing emissions 80 percent or more, and developing nations taking increasingly ambitious actions in the same time frame. Leaders of all G8 industrialized nations also endorsed these emission reductions objectives at their July 2009 summit. While developing nations have yet to embrace these 2050 emission reduction goals, many key nations appear willing to do so provided that developed nations play a major role in financing global action. The climate bill passed on June 26, 2009, by the U.S. House of Representatives (titled the American Clean Energy and Security Act) is broadly consistent with this emerging global policy framework as it would require the United States to reduce emissions 80 percent by 2050 and would make developing nations eligible for tens of billions of dollars in financial support for ambitious climate action.

*Finding: Achieving these goals will require reducing global emissions by 50 percent by 2050, with industrialized nations reducing emissions 80 percent or more, and developing nations taking increasingly ambitious actions in the same time frame.*

Achieving ambitious emissions reduction goals for 2050 will be impossible without nations setting and meeting interim benchmarks along the way. According to the Nobel Prize-winning Intergovernmental Panel on Climate Change, global emissions may need to peak within a decade, with emissions in developed nations declining 25-40 percent from 1990 levels by 2020 and emissions in developing nations making a significant deviation from business-as-usual projections. Making these mid-term goals a reality constitutes a major challenge for the United States and the world. It would require averting at least 17 billion tons per year of expected carbon dioxide emissions by 2020 under business-as-usual projections (see Figure 2).<sup>6</sup>

*Finding: Given the seriousness of these climate risks to U.S. national interests, it is imperative that the United States marshals an effective and timely global response.*

**Figure 2: Emerging Global Climate Objectives**



Source: Climate Advisers analysis, adapted from Project Catalyst (2009) *Limiting atmospheric CO<sub>2</sub>e to 450 ppm – the mitigation challenge*, San Francisco, CA, ClimateWorks Foundation.

Although developed countries are largely responsible for anthropogenic climate change, most cost-effective emission reductions opportunities are in the developing world. However, many developing nations have few resources and inadequate technical know-how for implementing climate solutions. Developing nations are also quick to highlight the inequity of expecting them to finance emissions mitigation simply because they have low-cost opportunities for action. From the standpoint of international equity, world leaders have agreed that although all countries should bear some responsibility, developed nations should do more not less than developing nations.

Solving the climate problem will not be easy. Indeed, the only path to stabilization that avoids the high risk of dangerous impacts, and that is both economically efficient and equitable, is for developed nations to partner with developing nations and jointly invest in the most cost-effective climate solutions.

Developed nations, including the United States, will need to provide substantial new funding to help finance international action.

*Finding: In order to reach these global goals in a cost-effective manner, developed nations will need to help finance substantial emission reductions in developing countries.*

*Principle: U.S. policies to reduce tropical deforestation must promote international partnerships.*



## Success Depends on Tropical Forests

As part of a comprehensive effort, focusing new international climate cooperation on reducing tropical deforestation will be absolutely essential. Tropical deforestation currently accounts for 5.5-6 billion tons of greenhouse gas emissions each year, nearly all in developing nations (see Figure 3).<sup>7</sup> In fact, together with other land-use changes forests account for 17 percent of global greenhouse gas emissions, more than all the automobiles, airplanes, trains and ships in the world.<sup>8</sup>

*Finding: Deforestation accounts for 17 percent of global emissions, more than the entire global transportation sector, and can be addressed cost-effectively now.*

(Recent studies have questioned this widely cited figure, suggesting it may be too high.<sup>9</sup> However, a scientific consensus has yet to emerge around a new number. Therefore, throughout this paper 17 percent is used since it is the current scientific consensus as reflected in the 2007 Intergovernmental Panel on Climate Change report.) Of the 11-12 billion tons of emission reductions

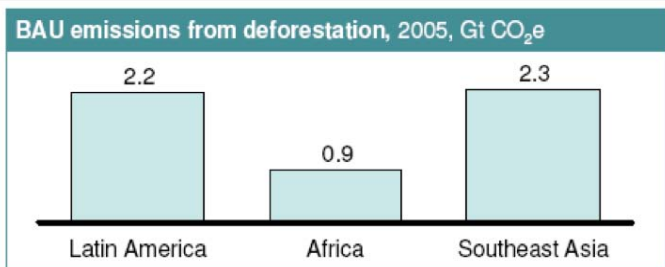
in developing nations that would need to be found by 2020 to reduce global emissions cost-effectively on a path toward a 50 percent reduction by 2050, about 40 percent could come from reducing tropical deforestation (3.5-4.0 billion tons) or planting new forests (0.5-1 billion tons).<sup>10</sup>

Thus, halving emissions from deforestation by 2020 is both achievable and necessary to help meet global emission reduction goals. An effective effort, however, must also engage countries with large standing forests but currently low rates of deforestation where forests may be threatened in the future under a business-as-usual scenario as global competition for land increases.

These forests represent one of the greatest potential new sources in emissions in the developing world absent immediate action. In short, without conserving tropical forests it will be virtually impossible for the world to avoid unacceptable risks of dangerous climate change.

*Finding: Meeting long-term emissions goals cost-effectively will be almost impossible absent a dramatic reduction in tropical deforestation before 2020.*

Figure 3: Geography of Emissions from Tropical Deforestation



Source: Project Catalyst (2009) *Towards the inclusion of forest-based mitigation in a global climate agreement*, San Francisco, CA, ClimateWorks Foundation.

Making tropical forest conservation a central element of a comprehensive U.S. climate program is the key to reducing emissions quickly and affordably. According to U.S. government estimates of the cap-and-trade bill approved by the House in June 2009, the overall cost of compliance with the bill would rise approximately \$500 billion if U.S. companies were not allowed to receive credit for financing international emissions reductions.<sup>11</sup> According to EPA cost curves, emission reductions from tropical forests could account for about 60 percent of the international reductions that could be financed in lieu of more costly domestic action, indicating that they would make up a substantial portion of emission reductions financed internationally by U.S. companies under a cap-and-trade program.<sup>12</sup> Other estimates suggest that tropical forests could account for over 80 percent of the lowest cost emission reductions in developing nations prior to 2020.<sup>13</sup>

Compared to other climate protection strategies, forest conservation also has the advantage of not requiring major new technologies to begin producing results (although it will require new governance, monitoring and verification and finance models). Along with other immediate emissions mitigation opportunities like efficiency gains, it can therefore help smooth the transition to a low-carbon economy,<sup>14</sup> buying time for the commercialization and dissemination of more advanced clean energy solutions.

**Commissioner Perspective:**

**FRANK LOY**

Former Under Secretary of State for Global Affairs

“What the science tells us today is brutal and unprecedented—though not without hope: Our knowledge and technology has given our species the power — by changing the planet’s climate — to worsen dramatically our way of life, and maybe threaten its very existence. That sounds like scaremongering, but the evidence is overwhelming. Solutions are hard to come by, largely because what needs to be done appears expensive (and hits established interests), and because industrialized and developing countries see the problem differently. Reducing tropical deforestation addresses exactly these barriers. It puts developing and industrialized countries more on the same side, and dramatically lowers the cost of what we must do.”

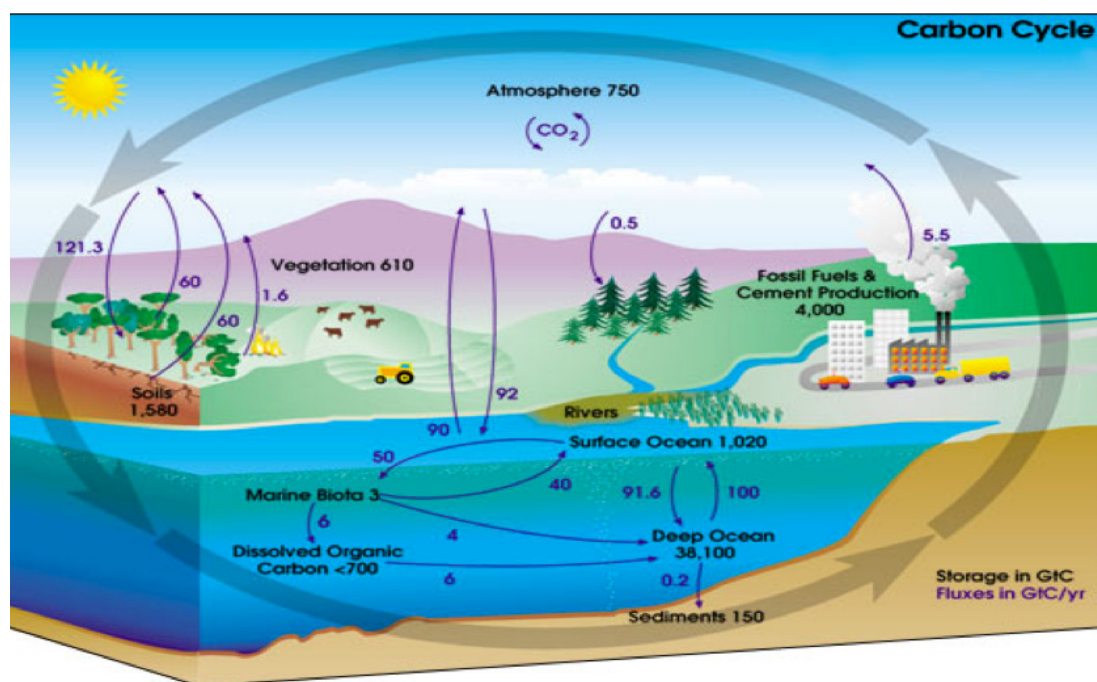
*Finding: The United States has much to gain by focusing on tropical deforestation as part of a balanced suite of policies that would also substantially reduce U.S. domestic emissions.*

**Box 1**  
**The Carbon Cycle**

Forests play a complex and poorly understood role in regulating the Earth's climate and mitigating the impacts of climate change (see Figure 4). Forests naturally absorb and release carbon dioxide from their biomass and soils. This annual natural flux (in purple) is much larger than changes in industrial emissions. Changes in forest cover

and quality, moreover, can increase or decrease carbon storage. Thus, unlike fossil fuels, tropical forests and soils can serve as “sinks” by removing carbon from the atmosphere. Carbon stored by forests and soils (in black) is also greater than carbon stored by the atmosphere.

**Figure 4: The Role of Forests in the Carbon Cycle**



Source: National Aeronautics and Space Administration (NASA) Earth Science Enterprise  
[http://earthobservatory.nasa.gov/Features/CarbonCycle/carbon\\_cycle4.php](http://earthobservatory.nasa.gov/Features/CarbonCycle/carbon_cycle4.php)

Well-managed tropical forests also reduce the vulnerability of developing nations to climate change, by helping to mitigate the impacts of extreme storms, floods, and drought. However, climate change also threatens the existence of tropical forests since these ecosystems are sensitive to changes in precipitation and temperature. Some scientists have projected that

even with optimistic assumptions about climate impacts over the next century the Amazon region could lose 20-40 percent or more of remaining forest cover solely as a result of climate change, which could have important economic, social and climate policy implications. This creates the possibility of a positive feedback loop between climate change and deforestation.

## The Current State of the World's Tropical Forests

Tropical deforestation rates increased 10 percent from the 1980s to the 1990s, and with few exceptions, most notably in Brazil, they show no signs of slowing in the current decade. About 13 million hectares of forest—an area about the size of New York State—were lost each year from 2000 to 2005.<sup>15</sup> Importantly, nearly all global emissions from deforestation are from developing countries in the tropics.<sup>16</sup> Deforestation is also highly concentrated geographically, with about 50 percent of emissions occurring in only two countries—Brazil and Indonesia—and a few dozen other developing countries in the tropics accounting for most of the rest.<sup>17</sup> Forests in many developed and developing nations, including the United States, China and Costa Rica, have actually increased in density and area over the past several decades.<sup>18</sup>

*Finding: The world's tropical forests are disappearing at an alarming rate.*

The direct causes of tropical deforestation vary by region—mainly ranching, agriculture, and logging—but are closely related to land tenure issues associated with all three and, important for all countries to address, global demand for food and forest products (see Figure 5).<sup>19</sup> Ranching and subsistence agriculture are the largest drivers in Latin America, while intensive and subsistence agriculture account for the bulk of emissions in Africa and Southeast Asia.

Brazil has reduced deforestation dramatically since 2004, but it remains unclear how permanent those gains really are in the context of rising commodity prices and its history of fluctuations in deforestation rates.<sup>20</sup> Costa Rica and China have largely stabilized deforestation with strong government backing and payments to local landowners for forest conservation and reforestation activities.<sup>21</sup> However, China's increasing demand for forest products has accelerated deforestation elsewhere in Southeast Asia and in other nations that lack environmental standards.<sup>22</sup> Some countries, such as India, have also made major strides, but in other nations tropical deforestation is still proceeding at an alarming



rate, creating the need for urgent action. Many poor nations in the Congo basin and parts of South America with large intact forests and historically low rates of forest loss could begin rapid deforestation soon. These high-forest, low-deforestation nations account for almost 20 percent of global forest carbon stocks.<sup>23</sup>

## Envisioning Solutions: A Forest Carbon Bridge

As forested nations undergo economic development, they tend to follow a traditional “forest transition” pathway that begins with an initial period of rapid deforestation and economic activity, followed by the stabilization and eventual re-growth of forests (see Figure 6).

Since the root cause of deforestation is, in most cases, the tangible economic benefit it generates in the form of timber revenue and/or income from farming and ranching, a key to success will be fundamentally realigning the economic incentives of developing nations and local stakeholders. Solutions will also need to be closely tailored to local drivers of deforestation, and political, social, economic and biological conditions. Policies will

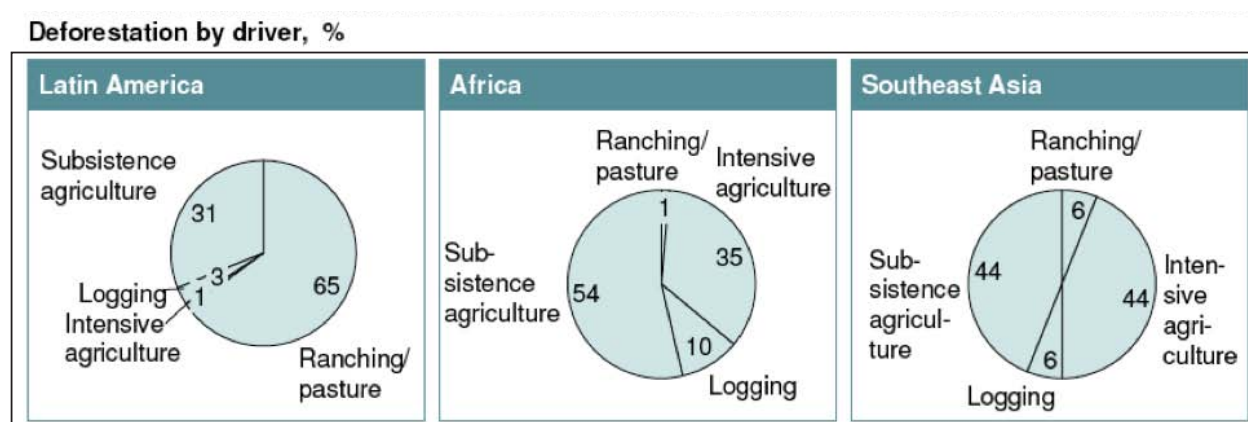
### Commissioner Perspective:

#### LYNN SCARLETT

Former Deputy Secretary of the Interior

“Conserving tropical forests sustains wildlife, protects water supplies, and helps moderate carbon dioxide levels globally. Seeing firsthand the effects of deforestation is humbling. Knowing those effects have worldwide environmental, economic, and social implications underscores the imperative of reversing the course of deforestation. Many local communities, through conservation partnerships, are conserving tropical forests, but only U.S. policy leadership can galvanize global action with the speed, scope, and scale necessary to prevent catastrophic forest losses. Cooperation among government officials in the U.S. and around the globe, working with those who rely on tropical forests for their livelihood, will be essential to sustain conservation. The recommendations we have delineated can help policy makers address deforestation challenges in the context of a changing climate.”

Figure 5: Drivers of Deforestation by Region



Source: Project Catalyst (2009) *Towards the inclusion of forest-based mitigation in a global climate agreement*, San Francisco, CA, ClimateWorks Foundation.

need to both help countries with currently high rates of deforestation to promote economic growth while reducing their deforestation rates and help countries with large forest stocks but low deforestation rates to “cross the gap” of the typical forest transition pathway from poverty to prosperity without passing through the intermediate stage of rapid deforestation that comes with traditional “carbon-intensive” economic development.<sup>24</sup>

This idea that economic incentives can help developing nations move from underdevelopment to prosperity in ways that avoid deforestation constitutes a “forest carbon bridge,” similar to the “leapfrogging” many developing nations have done in communications or information technology. In the forest sector, new financial incentives must be accompanied by fundamental reforms including land-use and land-tenure policies, forest governance, and infrastructure and agriculture policies. These reforms are needed to increase the effectiveness of government institutions, strengthen policy frameworks, fight corruption, and build local ownership of new forest conservation policies to ensure their implementation and sustainability.

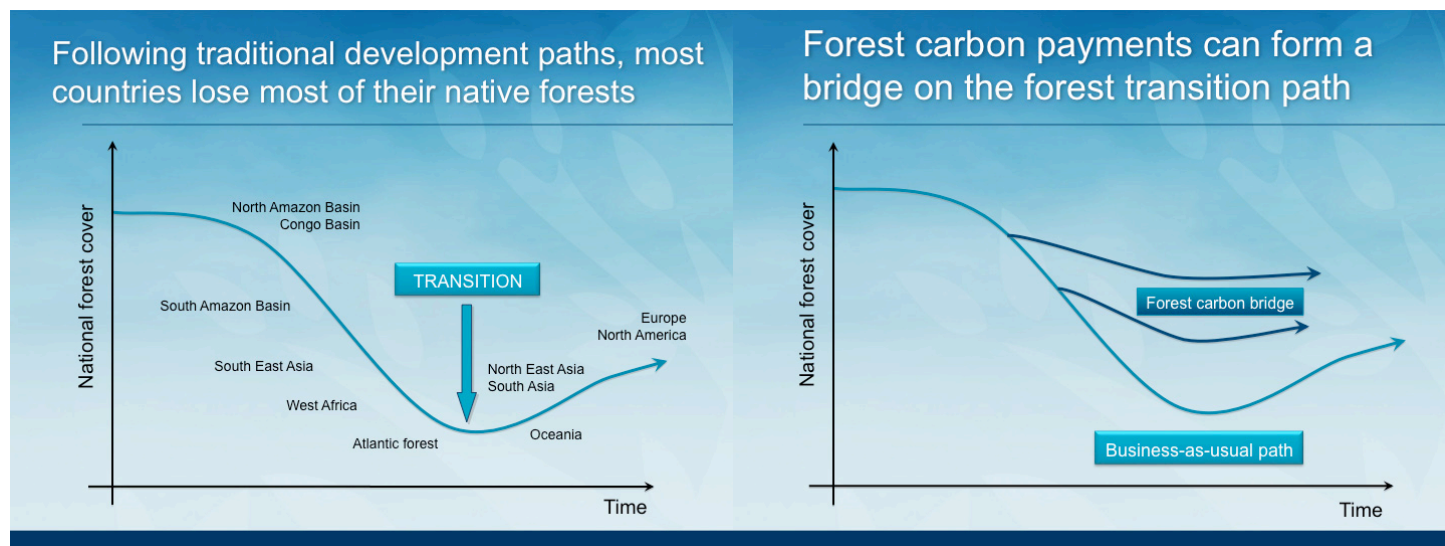
The need for external financing of the forest carbon bridge will dissipate over time as circumstances change in developing nations and that financing helps to promote sustainable, “low-carbon” economic growth and development. Deforestation pressures tend to decrease as populations urbanize, move into service and manufacturing sectors, intensify agricultural production, and improve natural resource management practices. Many developing nations can aim to cross the gap within a few decades, with the technical and financial support outlined in this report. For example, the goal of Brazil’s 2008 national forest conservation strategy is to reduce deforestation 80 percent by 2020, and progress so far is encouraging.<sup>25</sup>

## Best Activities and Places for Forest Conservation

*Finding: Economic incentives are needed to provide a “bridge” to lasting forest conservation in developing nations.*

Dividing forest-related emissions by source and cause helps identify the most realistic, beneficial and cost-effective solutions. By far the largest opportunity lies in reducing rates of deforestation (once called “avoided

Figure 6: Crossing the Gap



Source: Adapted from unpublished slides prepared by Loisel, C. and Zarin, D.

deforestation” and now more commonly referred to as “reduced emissions from deforestation and degradation” or the acronym REDD<sup>26</sup>). Other essential strategies for success include: reducing degradation associated with selective logging and other extractive activities; reforestation (planting new forests and revitalizing degraded forests); afforestation (planting new forests on lands that have not been forests for centuries or have never been forest); conserving carbon-rich peatlands (wetlands rich in carbon and other greenhouse gases) that can be cleared for biofuels or other uses; and improving forest management through more sustainable timber harvesting and other agro-forestry practices.<sup>27</sup> Degradation refers to the reduction of biomass in forests without resulting in full land conversion and can be an important precursor for deforestation, making the avoidance of degradation a critical component of any policy response. Reforestation and afforestation take longer to produce major gains, because trees require several decades to grow large enough to store substantial amounts of carbon. However, they reduce pressure on standing forests by creating a new, sustainable source of timber products.

Different activities will be more prevalent and productive in different locations, depending on forest types, historical patterns and current drivers of deforestation. Harnessing reductions from each activity will also require diverse policy frameworks and financial mechanisms. Whereas afforestation and reforestation are already permitted under international market approaches such as the Clean Development Mechanism, no established system exists for reducing emissions from deforestation, which may involve the more challenging process of setting baseline deforestation rates against which to measure progress, and measuring existing and future forest carbon stocks. Focusing on reducing deforestation, however, makes sense because emission reductions are affordable and provide many co-benefits (security, development and biodiversity). Emissions from extremely greenhouse gas-rich peatlands are particularly important in some locations, such as Indonesia, but peatlands-monitoring and measurement is even more challenging than for other activities. As soon as technical impediments can be overcome, however, peatlands lands are likely to

provide an attractive focus for U.S. leadership because emission reduction opportunities are expected to be low-cost and plentiful.

*Finding: The most cost-effective opportunities to reduce emissions from tropical deforestation are concentrated by activity and geography.*

The overall objectives laid out in this paper of reducing emissions from deforestation by 50 percent by 2020 and achieving net zero emissions by 2030 are intended to encompass all of these activities, with the acknowledgment that reductions in deforestation should be prioritized initially, and that accurately accounting for reductions from peatlands lands may require some time. A future ideal system would also include mechanisms for restoring productivity to degraded lands and improving agricultural practices—in other words promoting low-carbon practices throughout the land-use sector.<sup>28</sup>

In the near term, these emission reductions are most likely to be achieved in a few targeted areas of the world, including much of tropical South America and parts of Southeast Asia and Central America. In the future, Congo Basin countries hold great promise if local governance can be strengthened.<sup>29</sup>



**Recommendation: With other nations, the United States should lead a global partnership to cut tropical deforestation in half within a decade and achieve zero net emissions from the forest sector by no later than 2030.** Given the urgency and importance of tropical forest conservation to climate protection, the world must act decisively and ambitiously. The United States must play a leadership role in creating a strong global partnership with developing nations to reduce emissions from tropical deforestation by 50 percent within a decade and achieve zero net deforestation by 2030. This would amount to reducing emissions caused by tropical deforestation by 2.75-3 billion tons per year by 2020 and the full current 5.5-6 billion tons per year by 2030. Achieving this goal will not be easy, but it is feasible. With political will and ambitious actions by developing nations, supported by financial and technical assistance from developed nations, emission reductions from reducing deforestation can form a major component of the cost-effective, near-term reductions needed to achieve climate stabilization.

A review of economic models and country studies reveals two different scenarios for reaching this target: one where governance reforms unlock substantial mitigation potential in key geographic areas (especially Indonesia and the Congo Basin), and one where poor governance capacity continues to limit these opportunities. In either scenario, maximizing reductions in Brazil will be critical, as it is more prepared than perhaps any other nation to deliver large amounts of verified reductions. In order to meet the goal of reducing emissions from deforestation 50 percent by 2020, Brazil alone will likely need to reduce its emissions from deforestation by at least 1 billion tons, which is consistent with their national objectives. In a scenario where governance reforms are able to fully unlock mitigation potential in Indonesia and the Congo Basin, economic models indicate that combined these areas could deliver at least 1.1 billion tons of reductions by 2020.<sup>30</sup> This amount could substantially increase if opportunities in peatlands are captured or reductions are compared against business-as-usual projections instead of current levels. With modest reductions from other countries, including middle-income countries such as Malaysia and Mexico, the 50 percent target could be reached.

If governance reforms are not fully successful in Indonesia or the Congo Basin, it is likely that substantially fewer tons of verified reductions could be achieved from these areas. In this scenario, the world can only get close to its 2.75-3 billion ton goal by unlocking additional mitigation potential in non-Amazon regions of Brazil, including its Atlantic forests, and capturing nearly every available opportunity in other small- and medium-size nations. Therefore, the most promising U.S. strategy should include three concrete components: a major bilateral partnership with Brazil centered on results-based financial incentives for achieving national emission reductions from the forest sector; major bilateral partnerships with Indonesia and Congo Basin nations to build capacity, promote governance reforms and incentivize forest emission reductions; and a broad multilateral initiative with participation from small- and medium-sized tropical forest nations.

These partnerships could be prioritized on a variety of criteria, including emissions reduction potential, national readiness and associated “co-benefits” (national security, development and biodiversity). With success on these three fronts, it is feasible for the world to reach its objective of halving emissions from tropical deforestation within a decade. Achieving zero net emissions from deforestation by 2030 will obviously require scaling-up efforts and capturing all of these opportunities, while preventing increases elsewhere.

While these estimates are supported by economic analysis and national reviews, solutions will vary from place to place. The next section of this paper describes the challenges, strategies and implications of reducing emissions substantially in three specific locations — Brazil, Indonesia and the Congo Basin, the three largest tropical forest regions in the world. The focus on these large opportunities is not intended to downplay the potential of United States partnerships with smaller countries; indeed many nations such as Guyana have been and will continue to play leading roles in pioneering innovative policies and approaches that inform broader international efforts to reduce emissions from deforestation. The following case studies were chosen to illustrate in concrete terms the enormous

scale of efforts required and potential challenges that will be faced in some specific areas.

*Finding: A successful alliance will need to achieve substantial reductions in key countries and regions.*

## Case Studies

### Brazil

No country is more important for the global effort to reduce emissions from tropical deforestation than Brazil, and there is also no country more engaged in finding solutions. Deforestation in Brazil has largely been driven by the conversion of forests to cattle pasture, but illegal logging and the expansion of agricultural products such as soy have also been important factors. Recent news reports about local soy production in the state of Mato Grosso highlighted the dilemma faced by many Brazilian farmers.<sup>31</sup> Although some farmers and ranchers have a strong desire to do what is right for the environment, the financial benefits from clearing land for soy can be

nearly 100 times the payments they have been offered to keep forests standing on their land. Most farmers in the Amazon region are already required by national and local conservation laws to keep 50-80 percent of their land forested. In the past, these laws have been enforced sporadically, but efforts to crack down on illegal forest conversion have increased in recent years, resulting in dozens of convictions and imprisonments. Nonetheless, securing long-lasting gains against deforestation will be nearly impossible without changing underlying financial incentives faced by ranchers and farmers.

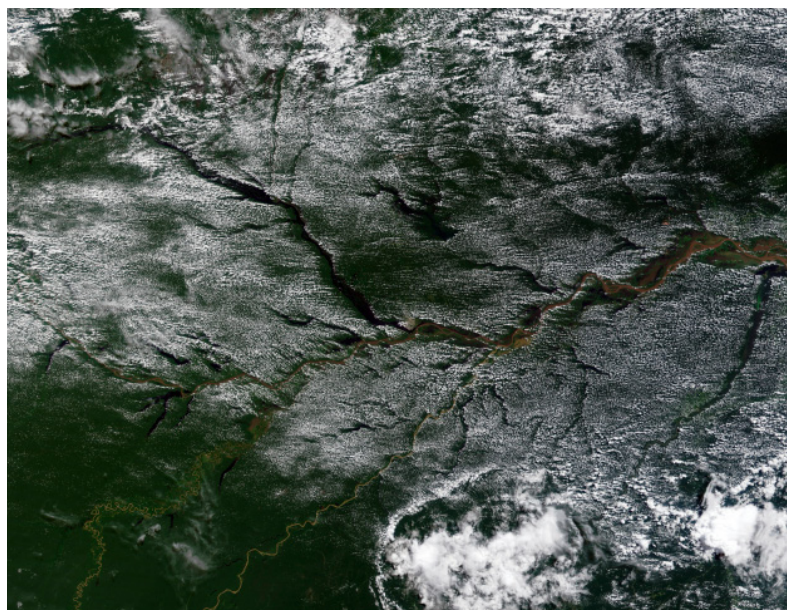
Emissions from deforestation alone in Brazil account for 2.5-5.0 percent of total global greenhouse gas emissions, making it the fourth-largest emitter in the world.<sup>32</sup> Over the past 30 years about 15 percent of the 1.2 billion acre Amazon region has been deforested, with rates fluctuating between about 2.5 million acres and 7 million acres per year, driven by long-term economic cycles and periodic policy interventions.<sup>33</sup> In 2004, one of the worst years on record, over 6.7 million acres of deforestation in the Brazilian Amazon accounted for about 1.8 billion tons of carbon dioxide emissions — over 50 percent of total national emissions.<sup>34</sup> While the deforestation rate fell to 3.0 million acres in 2007 with relatively low commodity prices, it increased with rising commodity prices in 2008, indicating that much work remains to be done (see Figure 7).

#### Commissioner Perspective:

#### THOMAS PICKERING

Former U.S. Ambassador to the United Nations

“If the U.S. is to lead the global effort to combat climate change, it must lead by example. At stake is our position as a global leader and our ability to achieve other major foreign policy objectives. Tropical forests offer a chance for developed nations, led by the U.S., to work hand-in-hand with developing nations to address climate change. It would be deeply short-sighted to let the politics of the moment blind us either to the significance of forests’ role or to the necessity of taking action now. The U.S. is the nation best suited to answer that call — and we must, not only to prevent catastrophe, but to restore our position as the leading global diplomat.”



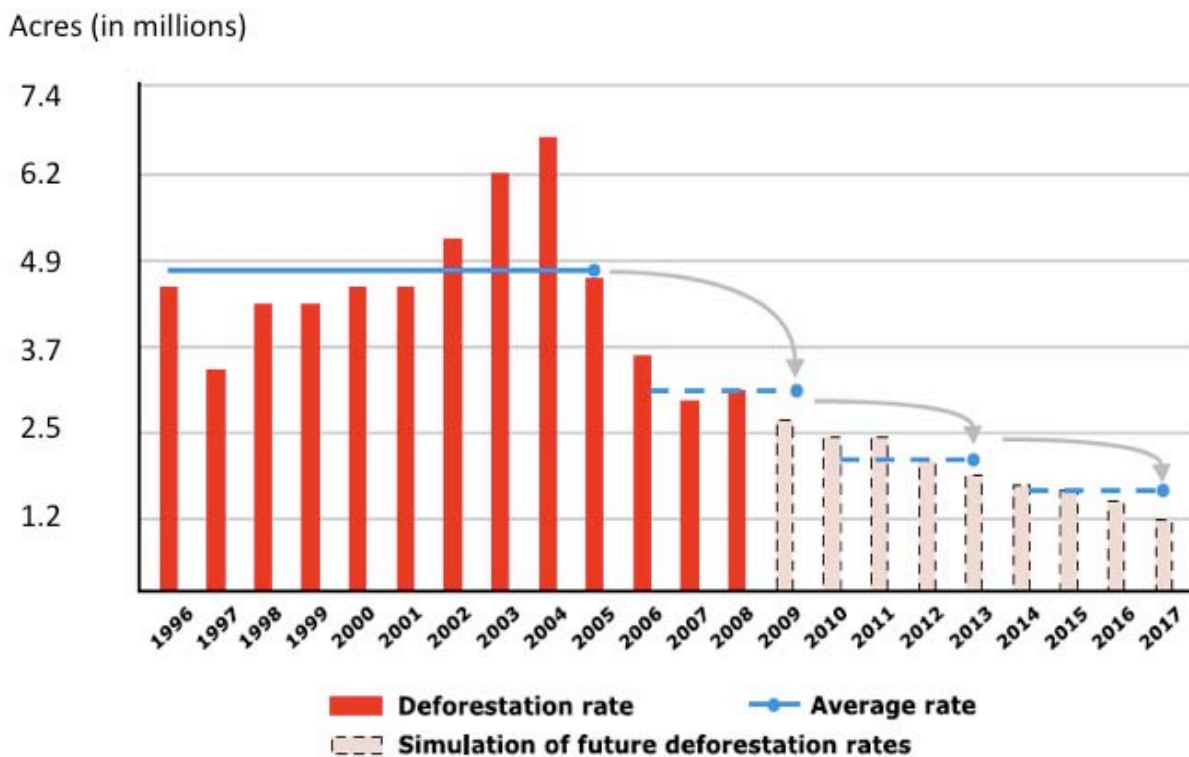
Brazil recently set an ambitious target of reducing its deforestation rate in the Amazon region 80 percent below its 1996-2005 historical average by 2020. If this Amazon region objective were achieved, emissions from deforestation in Brazil would be reduced by about 1.0 billion tons per year (depending on estimates of the carbon content of forests), greater than total emissions from Canada.

One recent analysis indicates that by further reducing this rate, by lowering deforestation rates in other areas of Brazil, and through reforestation initiatives, Brazil could achieve a total reduction of 1.36 billion tons below business-as-usual emissions in 2030.<sup>35</sup> Therefore, Brazil alone could yield almost one-half of necessary global reductions to halve deforestation by 2020, with further reductions to 2030.

Unlike many other developing nations, Brazil is well positioned to be able to measure, monitor and verify emission reductions in its forest sector. The country has invested heavily in earth observation satellites and remote sensing technologies. While further improvements will be necessary, Brazil’s forest and carbon data is at least as credible and current as that of many developed nations.

In 2008, Brazil announced the creation of an “Amazon Fund” intended to raise \$21 billion over 13 years from the international community to support Brazil’s efforts to halt deforestation in the Amazon region.<sup>36</sup> Thus, the fund represents the first truly large pay-for-performance approach where financial contributions translate into verifiable emission reductions, with donations structured as an “ex-post” payment at a rate of \$5 per ton of emissions reduced.<sup>37</sup>

Figure 7: Brazil’s Historic Deforestation Rate and Future Objectives



Source: Adapted from Government of Brazil (2007) *National Plan on Climate Change, Executive Summary*, Brazil.

Norway is the only nation that has already committed significant funding to the Amazon Fund, although a number of other developed nations are considering contributions. Norway has provided \$110 million to the fund based on emission reductions Brazil has achieved in the Amazon since 2006. In addition, Norway has pledged to contribute up to \$1 billion through 2020 provided Brazil continues to reduce its emissions in the Amazon.<sup>38</sup>

Brazil's commitment to reduce deforestation in the Amazon has been translated into official policy and is backed by deep and broadly felt popular concern in Brazil about both deforestation and climate change. However, the effectiveness of Brazil's initiatives will be tested in the coming years. One question now is whether other developed nations will come forward with contributions to the Amazon Fund. Another question is whether Brazil will be able to sustain progress in reducing deforestation when commodity prices increase for soy, beef and other agricultural products.

Importantly, Brazil's national government has thus far opposed selling emission reductions from the Amazon region into international private sector carbon markets. This presents a challenge for the United States, where regulated companies may want to purchase verified emission reductions from Brazil to help control the cost of new U.S. climate policies.

The Brazilian Federal government's opposition to participating in developed country carbon offset markets has also created tensions internally with Brazil's Amazon region states that see global carbon markets as a new source of revenue. States are interested in discussing market possibilities and are pushing the federal Government towards considering such options.

States have also been engaged in initiatives that involve U.S. state-level carbon markets, such as in California. The Obama Administration recently initiated bilateral climate change consultations with Brazil, which could result in a new framework for U.S. support for reducing deforestation in the Amazon.

## Indonesia

Reducing emissions from deforestation in Indonesia is also essential to meeting the goal of lowering global emissions from deforestation by 50 percent by 2020 and achieving zero net emissions by 2030. Indonesia is the world's third largest greenhouse gas emitter, largely because of emissions from deforestation and destruction of peatlands lands. Deforestation in Indonesia is occurring almost as rapidly as in Brazil, with 4.9 million acres lost in 2005, accounting for about 850 million tons of carbon dioxide emissions. Combined with emissions from peatlands lands, total emissions can stretch over 2 billion tons per year<sup>39</sup> or about 6 percent of total global emissions from all sectors. Deforestation in Indonesia is driven by global demand for food and forest products, especially hardwood, paper, and, increasingly, biofuels such as palm oil. Like cattle and soy in Brazil, palm oil production in Indonesia has recently been at the frontier of the tradeoff between economic growth and the protection of forests. The palm oil industry's

### Commissioner Perspective:

#### **MARK TERCEK**

CEO, The Nature Conservancy

"Tropical forests serve as the lungs of the Earth. They manage the world's carbon dioxide levels, are home to the world's most diverse species and provide essential services — such as food, water and shelter — to millions of people across the globe. But these vital ecosystems are disappearing at an alarming rate. The good news is preserving these forests requires no new technologies — just a truly collaborative effort that provides incentives to protect forests long-term. Successful on-the-ground projects prove we can achieve carbon emission reductions while working with local stakeholders to incentivize forest preservation. Without U.S. leadership, however, taking these efforts to a global scale will be extraordinarily difficult. There is a strong foundation of success to build on, and we need to start now."



growth has been driven by demand for biofuels from the developed world and China. Conversion of native forests to fiber plantations has also been exacerbated by an overcapacity of mill facilities that far exceeds sustainable rates of production.

According to economic models, forest conservation efforts in Indonesia could be highly cost-effective and large-scale. Indonesian forests could actually have negative net emissions by 2030 at relatively low costs per ton (i.e. reforestation would absorb more carbon than is emitted by deforestation). This could account for a reduction of 1.1 billion tons of forest emissions by 2030, and peatlands lands could deliver an additional 0.7 billion tons of abatement by 2030. According to one study, in both cases, most of these reductions would cost less than \$8 per ton, which is less than half the expected price of carbon under the House climate bill and significantly less than the cost of carbon today in Europe.<sup>40</sup> An investment of roughly \$10 billion per year by 2020 therefore has the potential to yield about 1 billion tons of emission reductions per year from Indonesia's forests.

Actual reductions are unlikely to come close to reaching 1 billion tons without large-scale reforms in Indonesia that address the substantial governance, enforcement and illegal logging challenges. According to one economic model where governance factors are included, verified reductions from deforestation in Indonesia would only reach about 300 million tons per year by 2020.<sup>41</sup> Some believe even that total would be a major achievement. Given the importance of achieving reductions in Indonesia to reaching global goals, it will be critical for the United States to mobilize assistance to support and incentivize Indonesia's efforts to reform forest sector policies and governance.

#### **Commissioner Perspective:**

#### **D. JAMES BAKER**

Director, Global Carbon Measurement Program,  
The William J. Clinton Foundation

"America and the world cannot win the fight against rapidly accelerating climate change unless we are prepared to confront all major sources of greenhouse gas emissions. Reducing deforestation and creating new forests are the quickest and most cost-effective ways to reduce carbon dioxide emissions. Together with the emissions from transportation and industry, deforestation represents 30 percent of the total reductions we must make. But it must be done the right way. Proper monitoring, reporting and verification are essential to the success of any program we create. We have a choice — to act now and launch an effective global system, or to watch our broader efforts on climate fail. I think the choice is clear."

One of the greatest challenges for the national and local governments in Indonesia is continuing to crack down on corruption and illegal logging. According to recent reports some improvements have been made, but many experts believe the problem is still rampant.<sup>42</sup> In 2004 Indonesia's environment minister announced that he believed 75 percent of timber in Indonesia was logged illegally. Addressing these issues will not be easy, given the amount of money involved

and close historic ties between logging and paper companies and government officials. Indonesia exports about \$5 billion in tropical timber annually, but loses about \$1 billion a year in tax revenue from illegal timber, much of it thought to be smuggled through nearby areas of Malaysia and Singapore. Logging has devastated some of the most remote areas on the islands of Borneo and Sumatra.<sup>43</sup>

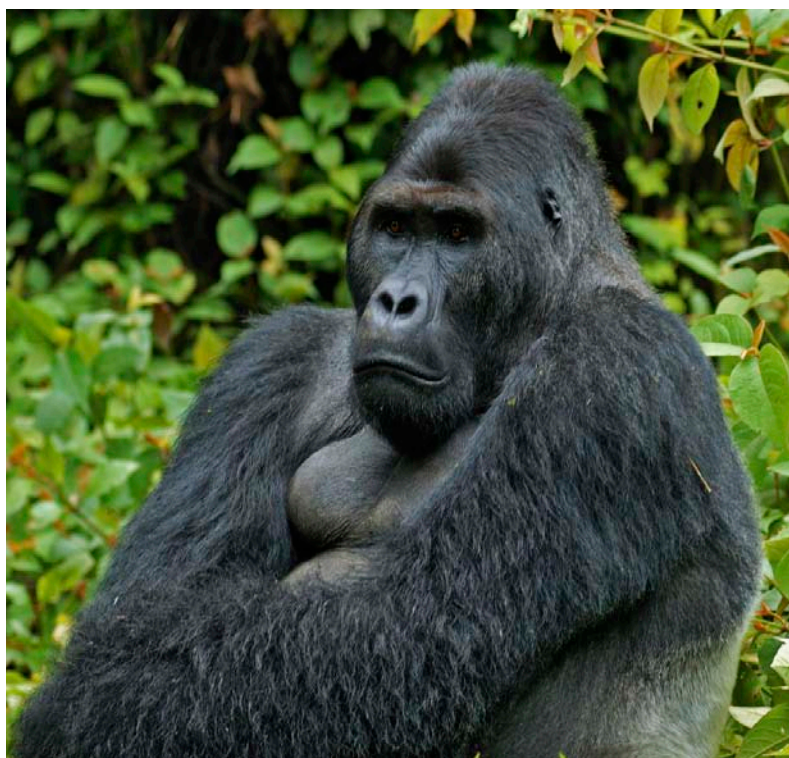
The pulp and paper industry has presented particularly serious challenges, since in many areas the capacity of plants has expanded well beyond the supply of legally harvested timber. Instead of slowing growth of the industry, developers pushed for additional expansion of plantation forests, in some cases to the detriment of carbon-rich peatlands lands.<sup>44</sup> Developed nations such as the United States have an important role to play in this effort by enforcing their existing bans against illegally logged timber and timber product imports.

However, many believe that Indonesia's recent efforts to reduce deforestation are signs of renewed commitment and future success. Indeed, the national government in Indonesia appears eager to partner with developed nations to reduce its deforestation rates. Unlike Brazil, and Indonesia is not opposed to including forests in global carbon markets in some form, and asked for \$4 billion between now and 2012 to prepare the country to deliver verified emission reductions for these markets.<sup>45</sup> The government recently released its proposed rules for how revenues would be shared between the local and national governments and project developers for forest conservation projects that could generate credits to be sold into U.S. global markets, indicating that it is serious about taking action if financial incentives are on the table.<sup>46</sup> Indonesia has also been working with Australia and other nations to develop a more robust national system to measure and monitor its forests.<sup>47</sup> Equally if not more important has been the establishment of the Timber Legality Verification System / System Verifikasi Legalitas Kayu (SVLK) that will enable the Indonesian government to assess the legality of timber produced and traded by its forest products industry. This is an important and noteworthy step and hints at the type of concrete actions that will be necessary, perhaps

supported by external financing, to actually reduce deforestation and forest degradation rates. With these initial steps and the appearance of political support at the highest levels of government, Indonesia appears ready to engage in this issue, but given its history, the success of these efforts is still uncertain.<sup>48</sup>

## Congo Basin

Rising global demand for food and forest products, coupled with new efforts to reduce deforestation in countries where rates are currently high, will put additional pressure on nations with large forests and low rates of deforestation. The Congo Basin region of Central Africa is a prime example of an area where deforestation rates could increase dramatically without sound policies and robust supporting incentives. The Congo Basin region is about 445 million acres and accounts for 20 percent of the world's remaining tropical forests.<sup>49</sup> This forested area is roughly three times the size of Texas. Countries in the region include the Democratic Republic of the Congo, the Republic of the Congo, Cameroon, the Central African Republic, and Gabon. Congo Basin forests are under increasing pressure from commercial



and subsistence timber harvesting, mineral extraction, and subsistence agriculture. A number of organizations and funds have already joined together to tackle this challenge, including the U.S.-led Congo Basin Forest Partnership (CBFP) and the U.K.- and Norway-led Congo Basin Forest Fund (CBFF). The CBFP has helped central African nations protect more than 115 million acres of tropical forests.<sup>50</sup> The CBFF has received an initial contribution of about U.S. \$200 million, which aims to achieve emission reductions at a cost of about \$6 per ton.<sup>51</sup>

Since the mid 1990's, civil strife in the Congo Basin has placed enormous pressure on forested lands. Hundreds of thousands of refugees have moved through these forests, looting national parks and constructing refugee camps on park borders. As conflict has subsided, logging has increased. In 2004, encouraged by the World Bank, the Republic of the Congo announced its plans to intensify commercial logging. Illegal logging is widespread in many areas as underpaid bureaucrats continue to supplement their incomes by opening restricted areas. Subsistence agriculture is also driving deforestation, as poor farmers and villagers rely on forest lands for farmland and fuel wood.<sup>52</sup>

Above and beyond the challenges involved in managing and conserving the forests of the Congo Basin generally, there are three additional hurdles that must be overcome to include the Congo Basin in climate-related forest conservation programs. The first is undertaking the fundamental governance and policy reforms necessary

to make forest conservation a national and regional priority. The second is building the capacity of the Congo Basin countries to accurately measure, monitor and verify emission reductions. The third is determining the scale and structure of conservation incentives in a context where deforestation rates are relatively low now but could rise substantially in the future. It will no doubt take time, financial resources, and technical assistance to sufficiently address these challenges. Based solely on current deforestation rates, Congo Basin countries could generate hundreds of millions of tons of annual emission reductions by 2020 from current levels if adequate financial incentives were available, on the order of several billion dollars.<sup>53</sup> Without effective policy reforms and capacity building, that mitigation opportunity will be reduced to a small fraction of its potential.<sup>54</sup> Reaching the level of capacity needed to achieve these reductions will be a major challenge, but one that the world must take on in order to halve emissions from tropical deforestation by 2020 and achieve zero net emissions by 2030.

International forest conservation is clearly one of the most cost-effective emissions mitigation strategies. Importantly, however, international forest conservation would produce many other benefits to the United States and the world, including strengthening international peace and security, promoting sustainable development and poverty alleviation, improving local governance, combating illegal logging, conserving global biodiversity and protecting critical ecosystems on which people and wildlife depend.

## Many Other Benefits

### Strengthening International Security

In addition to the impacts of climate change itself, direct effects of environmental degradation and conflict over natural resources, including forests, have emerged as leading global threats to U.S. and international security,

*Finding: A global effort to reduce tropical deforestation would strengthen international security by addressing a key source of political instability and conflict.*