

# Origins, Development and Potential of the International REDD Market

A Significant Research Paper



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**Brian McFarland**  
**MBA Candidate, Kogod School of Business**  
**MA Candidate, School of International Service**  
**The American University of Washington, DC**

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## **Executive Summary**

The following Master's Significant Research Paper (SRP) for American University's School of International Service focuses on the origins, recent developments and future potential of the international reduced emissions from deforestation and degradation (REDD) markets.

The paper begins by examining the problem of deforestation in terms of its contribution to greenhouse gas emissions as well as the resulting loss of valuable ecosystem services. After this contextualization of the problem, the paper then defines REDD and explains its historical origins.

Next, an overview of the policy and market frameworks for international climate change legislation - both for the voluntary and compliance markets - is provided, while also paying special attention to REDD's role.

With this comprehensive framework in place, the proceeding section reviews the current REDD projects being developed to better understand: who is developing the projects, the projects' current locations, certification standards chosen, and the best practices employed that could be incorporated into a eventual compliance market which accepts international REDD projects.

The final section of this SRP highlights the potential of international REDD markets including financial flows, future project locations and the resulting benefits to local communities and biodiversity.

**Key Words:** Reduced Emissions from Deforestation and Degradation (REDD), additionality, leakage, permanence, voluntary and compliance carbon markets.

## Introduction

What is the potential of international REDD markets if the United States of America adopts a national or integrated regional cap-and-trade system which allows for a REDD mechanism? Such a topic is of the utmost importance because tropical forests are being quickly deforested while REDD simultaneously offers the best potential conservation finance mechanism to date. With this research question in mind, the following SRP utilizes a methodology of primary, interview-based research, unstructured conversations, and an extensive, secondary literature review. While not an all-encompassing list, consultative discussions have taken place with the following individuals and it is important to note the following SRP is only a reflection of the author's opinion and is not to be attributed to those listed below:

### Analysts

Justin Felt, Point Carbon

Thomas Marcello, Bloomberg's New Energy Finance

### Financial Services

Adam Raphaely, TFS Green

David Nussbaum, Evolution Markets

Radha Kuppalli, New Forests

Jarett Emert, CantorCO<sub>2</sub>e

Jane Lloyd, Markit Environmental Registry

### Government / NGOs

Benoit Bosquet, World Bank

Tonya Rawe, CARE

Eric Carlson, Carbonfund.org

### Project Auditors

Jeff Hayward, Rainforest Alliance

Mauricio Voivodic, Imaflora

### Scientists / Project Developers

David Shoch, Terra Carbon LLC

Dr. Bryan Foster, Ecologic

Jan Fehse, EcoSecurities

Dr. Chris Tuite, Conservation International

Sean Carney, Finite Carbon

Dr. Sarah Otterstrom, Paso Pacifico

Zoe Kant, The Nature Conservancy

Gabriel Ribenboim, Amazonas Sustainable Foundation

Initial expectations of this research were:

- Deforestation is increasing over a historical baseline;
- The US voluntary carbon market is the driving force for REDD markets and there are at least 15 REDD projects under development;

- A compliance market in the US will allow for REDD and create immense funding opportunities;
- Both the Senate and House of Representatives' most recent, pending legislation will specifically highlight REDD;
- Current, voluntary REDD projects are being implemented in countries with: stable governmental institutions, the highest rates of deforestation and significant biomass;
- Private investors are willing to commit significant sums of money - totaling over US\$10 billion dollars per year - only if the US develops a compliance market.

## **The Problem of Deforestation**

### *Background*

Since the Industrial Revolution, there has been an increase in globalization and this is most notably characterized by the advancement of technology, reduction of transportation costs, international communication, and the integration of financial markets. These developments have coincided with a drastic increase in the consumption of our world's natural resources including fisheries, freshwater and forests. Regarding the trend of deforestation;

Imagine a time-lapse film of the Earth taken from space. Play back the last 10,000 years sped up so that a millennium passes every minute. For more than seven of the ten minutes, the screen displays what looks like a still photograph: the blue planet Earth, its lands swathed in a mantle of trees. Forests cover 34% of the land. {...} After seven and a half minutes, the land around Athens and the tiny islands of the Aegean Sea lose their forest. {...} At nine minutes - 1,000 years ago - the mantle grows threadbare in scattered parts of Europe, Central America, China and India. Then 12 seconds from the end, two centuries ago, the thinning spreads, leaving parts of Europe and China bare. Six seconds from the end, one century ago, eastern North America is deforested. This is the Industrial Revolution. Little else appears to have changed. Forests cover 32 percent of the land. In the last three seconds - after 1950 - the change accelerates explosively. Vast tracts of forest vanish from Japan, the Philippines, and the mainland of Southeast Asia, from most of Central America and the horn of Africa, from western North America and eastern South America, from the Indian subcontinent and sub-Saharan Africa. Fires rage in the Amazon basin where they never did before, set by ranchers and peasants. Central Europe's forests die, poisoned by the air and the rain. Southeast Asia resembles a dog with mange. Malaysian Borneo appears shaved. In the final fractions of a second, the clearing spreads to Siberia and the Canadian north. Forests disappear so suddenly from so many places that it looks like a plague of locusts has descended on the plant. The film

freezes on the last frame. Trees cover 26 percent of the land. Three-fourths of the original forest area still bears some tree cover. But just 12 percent of the earth's surface - one-third of the initial total - consists of intact forest ecosystems. The rest holds biologically impoverished stands of commercial timber and fragmented regrowth. This is the present: a globe profoundly altered by the workings - or failings - of the human economy.<sup>1</sup>

While parts of our world, particularly New England, are experiencing net reforestation rates, tropical deforestation is still occurring at a rate of approximately 1 million hectares per month and perhaps already a few thousand acres since your reading of these first couple of pages.<sup>2</sup>

### *Regions and Rates of Deforestation*

According to the State of the World's Forests 2009 Report issued by the United Nations' Food and Agricultural Organization (FAO), the following countries have the highest net loss of forests in terms of a percentage of their land area and total land area for the periods of 1990 - 2000 and 2000 - 2005:

### **Top 10 Forest Cover Change Rates: 1990 - 2000 (Percentage) and 1990 - 2000 (Hectares)<sup>3</sup>**

	<b>Country</b>	<b>Net Change (%)</b>		<b>Country</b>	<b>Annual Change (Hectares)</b>
1	Comoros	-4.0%	1	Brazil	-2,681,000
2	Burundi	-3.7%	2	Indonesia	-1,872,000
3	Niger	-3.7%	3	Sudan	-589,000
4	Togo	-3.4%	4	DR Congo	-532,000
5	Honduras	-3.0%	5	Myanmar	-467,000
6	Philippines	-2.8%	6	Zambia	-445,000
7	Nigeria	-2.7%	7	Tanzania	-412,000
8	Mauritania	-2.7%	8	Nigeria	-410,000
9	Afghanistan	-2.5%	9	Mexico	-348,000
10	Benin and Nepal	-2.1% (each)	10	Australia	-326,000

<sup>1</sup> Alan Thein Durning, "Saving the Forests," Pages 5 - 6.

<sup>2</sup> Dr. Don J Melnick, "Building the Amazon Forest Carbon Partnership."

<sup>3</sup> UN FAO, "Table 2: Forest area and area change," <ftp://ftp.fao.org/docrep/fao/011/i0350e/i0350e04b.pdf>

**Top 10 Forest Cover Change Rates: 2000 - 2005 (Percentage) and 2000 - 2005 (Hectares)<sup>4</sup>**

	Country	Net Change (%)		Country	Annual Change (Hectares)
1	Comoros	-7.4%	1	Brazil	-3,103,000
2	Burundi	-5.2%	2	Indonesia	-1,871,000
3	Togo	-4.5%	3	Sudan	-589,000
4	Mauritania	-3.4%	4	Myanmar	-466,000
5	Nigeria	-3.3%	5	Zambia	-435,000
6	Honduras	-3.1%	6	Tanzania	-412,000
7	Afghanistan	-3.1%	7	Nigeria	-410,000
8	Benin	-2.5%	8	DR Congo	-319,000
9	Uganda	-2.2%	9	Zimbabwe	-313,000
10	Pakistan and Philippines	-2.1% (each)	10	Venezuela	-288,000

With careful observation, it is clear the African continent is highly represented in the deforestation of 1990 - 2000 and 2000 - 2005 with five of the top ten rankings among both the list of highest percentage of forests lost and the overall net loss in hectares. However, the countries listed as top percentage change and those countries listed for top overall changes in net hectares are very different. This being said, Comoros and Burundi have the two highest percentage changes of lost forests for both time periods, but do not make the top ten in terms of net land area loss. Furthermore, it is important to recognize that Brazil and Indonesia collectively had more land cleared than the remaining top ten countries both for 1990 - 2000 and 2000 - 2005, yet are not among the top percentage countries. In addition, only one “developed” or “industrialized” country was listed in the top ten and this happened to be Australia with an average of 326,000 hectares cleared each year during 1990 - 2000. Yet it is also important to recognize that such “developed” countries are frequently the drivers of land use change as they consume approximately 86% of the world’s aluminum, 81% of the world’s paper, 80% of the world’s iron and steel, 76% of the world’s timber, and own 87% of the world’s vehicles.<sup>5</sup> In addition, the countries from 1990 - 2000 are fairly the same as 2000 - 2005 with only two different countries in the percentage rate (i.e., Pakistan and Uganda replaced Nepal and Niger for

<sup>4</sup> UN FAO, “Table 2: Forest area and area change,” <ftp://ftp.fao.org/docrep/fao/011/i0350e/i0350e04b.pdf>

<sup>5</sup> Dr. Joseph Domask, “International Development and Environment,” Fall 2004.

2000 - 2005) and two different countries in the net change area (i.e., Zimbabwe and Venezuela replaced Mexico and Australia for 2000 - 2005) being different.

After reviewing the countries with high levels of deforestation, the vast majority appear to be corrupt, experiencing a conflict, and/or have weak institutions. Thus, Burundi which is number two in terms of highest percentage of deforestation is ranked 158<sup>th</sup> out of 180 most corrupt countries according to Transparency International's Global Corruption Report 2009, while Nigeria is 121<sup>st</sup> and Zimbabwe is 166<sup>th</sup>.<sup>6</sup> For 2008's Global Corruption Report, Nepal and the Philippines were both tied for 131<sup>st</sup> of 180.<sup>7</sup> In addition, Afghanistan, Burundi, Myanmar, Pakistan, Sudan, Zimbabwe, and the Democratic Republic of Congo are all currently experiencing, or recently experienced, severe conflicts. Countries such as Brazil and Indonesia - in part due to their vast expanses of remote forests - have weak governmental institutions to combat illegal deforestation and subsistence-driven land clearing. It should also be noted that there are additional driving forces for deforestation in the different regions and specific countries such as logging, subsistence or commercial agricultural, livestock operations or forest fires. Furthermore, the root cause of deforestation is not necessarily corruption, conflict or weak institutions, but probably rather global inequality and such a discussion is outside the realm of this SRP.

In contrast to deforestation, the following chart is attributed to the State of the World's Forest 2009 report and conveys the countries with the highest total forest area and the largest percentage of land area still classified as a forest.

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<sup>6</sup> Transparency International, "Global Corruption Report," [http://www.transparency.org/publications/gcr/gcr\\_2009](http://www.transparency.org/publications/gcr/gcr_2009)

<sup>7</sup> Transparency International, "Global Corruption Report,"  
[http://www.transparency.org/publications/gcr/gcr\\_2008#7.2](http://www.transparency.org/publications/gcr/gcr_2008#7.2)



### Top 10 Forested Countries as of 2005: Extent of Forest Area and Percentage of Land Area<sup>8</sup>

	Country	Total Forest Area (Ha)		Country	Land Area (%)
1	Russia Federation	808,790,000	1	Suriname	94.7%
2	Brazil	477,698,000	2	French Guiana	91.8%
3	Canada	310,134,000	3	Micronesia	90.6%
4	USA	303,089,000	4	American Samoa	89.4%
5	China	197,290,000	5	Seychelles	88.9%
6	Australia	163,678,000	6	Palau	87.6%
7	DR of Congo	133,610,000	7	Gabon	84.5%
8	Indonesia	88,495,000	8	Pitcairn Islands	83.3%
9	Peru	68,742,000	9	Turks and Caicos	80.0%
10	India	67,701,000	10	Solomon Islands	77.6%

Another observation which can be made is that among the top forested countries, the total forest areas tend to be among countries with the largest overall land mass as compared to smaller countries, and particularly islands, that have the highest percentage of land area remaining in forest. Thus, the top 5 countries in terms of land mass are:

- #1: Russia and #1 in total forest area
- #2: Canada and #3 in total forest area
- #3: China and #5 in total forest area
- #4 USA and #4 in total forest area
- #5 Brazil and #2 in total forest area<sup>9</sup>

While there were still approximately 3.95 billion hectares (i.e., 15.26 million square miles) of forests remaining on planet Earth as of 2005, deforestation is especially severe in select regions and is leading to fragmented, degraded landscapes.<sup>10</sup>

<sup>8</sup> UN FAO, "Table 2: Forest area and area change," <ftp://ftp.fao.org/docrep/fao/011/i0350e/i0350e04b.pdf>

<sup>9</sup> World Atlas, "The List," <http://www.worldatlas.com/geoquiz/thelist.htm>

<sup>10</sup> UN FAO, "Table 2: Forest area and area change," <ftp://ftp.fao.org/docrep/fao/011/i0350e/i0350e04b.pdf>

### *An Interconnected System*

Deforestation and degradation is so widespread that it currently contributes approximately twenty percent of the greenhouse gas (GHG) emissions to our Earth's atmosphere. In fact, this is more GHG emissions than the entire world's transportation activities - including automobiles, tractor trailer trucks and busses' fuel combustion - combined. This point can be further articulated by looking at the world's largest GHG emitting countries. Thus, the relative ranking of the top 5 GHG emitters in 2000 if land-use changes (i.e., deforestation and degradation) were excluded are:

- 1. United States of America
- 2. China
- 3. Russia Federation
- 4. India
- 5. Japan

Yet in contrast, the relative ranking of the top 5 GHG emitters in 2000 if land-use change was included are instead:

- 1. United States of America
- 2. China
- 3. Indonesia
- 4. Brazil
- 5. Russia Federation<sup>11</sup>

The world's forests not only provide climatic benefits of sequestering carbon dioxide emissions, but also freely provide a range of additional ecosystem services such as: erosion control; water cycling, filtration and storage; oxygen production; nutrient recycling; habitat for wildlife; buffers for storms (i.e., mangrove forests and hurricanes); along with medicine and food for both local communities and international consumers. E.O. Wilson, the world renowned

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<sup>11</sup> Larry Parker and John Blodgett, "CRS Report for Congress," <http://www.fas.org/sgp/crs/misc/RL32721.pdf>

Harvard University biologist, states that habitat loss (i.e., anthropogenic deforestation and degradation) is the primary cause of biodiversity loss.<sup>12</sup>

According to Dr. William Laurance of the Smithsonian Tropical Research Institute, deforestation of the Amazon Rainforest was occurring at a rate of 3.5 million acres a year during the mid-1990s; between 2003 and 2005, this rate was closer to 6.5 million acres each year. To place this in more comprehensible terms, 6.5 million acres each year is the equivalent of seven to ten football fields of deforestation each minute for three years in a row.<sup>13</sup> Clearly there is a problem with deforestation and despite international efforts and institutions such as the United Nations FAO, a new mechanism must be utilized to correct this problem. To the great potential of REDD we shall now turn.

## **What is REDD?**

### *The Definition and Origins of REDD*

REDD is an acronym for Reducing Emissions for Deforestation and Degradation. According to the United Nations REDD Program, REDD is described as “an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development.”<sup>14</sup> Such deforestation can either be planned (e.g., a logging concession is granted) or unplanned (e.g., illegal logging or cattle ranching operation) and takes place in either mosaic (i.e., alongside population centers) or frontier landscapes (i.e., newly accessible forests). Essentially a baseline scenario of deforestation is established and if project activities are successfully implemented to mitigate such deforestation, the emissions which would have been released can be quantified and sold as a carbon reduction credits.

With this in mind, REDD initially gained traction as a demonstration project in Bolivia. Such a project, located at the Noel Kempff Mercado National Park, was launched in 1997 by The Nature Conservancy, the Bolivian Government and a local NGO called Friends of Nature Foundation with financial support from American Electric Power, BP Amoco, and PacifiCorp.

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<sup>12</sup> Wilson, “The Creation,” page 53.

<sup>13</sup> Dr. William Laurance, “Talk of the Nation.”

<sup>14</sup> UN-REDD Program, “About REDD,” <http://www.un-redd.org/AboutREDD/tabid/582/language/en-US/Default.aspx>

In addition, members of Winrock International were instrumental in conducting the technical measurements of the project's biomass and deforestation projections. While there are some notable problems of the Noel Kempff project which will be discussed in the next subsection, this demonstration project helped the concept of REDD to begin.<sup>15</sup> In May of 2005, the Coalition for Rainforest Nations was formed and during the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) #11 in Montreal during December 2005, REDD was officially placed back on the agenda as a potentially viable policy option.<sup>16</sup> REDD was further refined during the COP-13 in December 2007 with the Bali Action Plan which called for:

- *“Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries. (AND)*
- *All Parties should collectively aim at halting forest cover loss in developing countries by 2030 at the latest and reducing gross deforestation in developing countries by at least 50 per cent by 2020 compared to current levels.”<sup>17</sup>*

As a result of this increasing clarity on policy, Merrill Lynch and Carbon Conservation shortly thereafter in February 2008 announced their partnership towards financing, developing, and monetizing the first ever certified REDD project in Indonesia's Ulu Masen Ecosystem of the Aceh Province to the Climate, Community and Biodiversity Standard.<sup>18</sup>

### *The Promise and Problems of REDD*

REDD has the promise of halting deforestation by annually transferring billions of dollars towards forest conservation projects which incorporate biodiversity monitoring and community development. Such project activities could include promoting alternative economic livelihoods that are sustainable and do not result in slash-and-burn agriculture, converting land to extensive cattle pastures or monoculture plantations, mitigating illegal logging, or selling land to

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<sup>15</sup> William Powers, “Whispering in the Giant's Ear,” chapter 2.

<sup>16</sup> Carbon Planet, “The History of REDD,” [http://unfccc.int/files/methods\\_science/redd/application/pdf/the\\_history\\_of\\_redd\\_carbon\\_planet.pdf](http://unfccc.int/files/methods_science/redd/application/pdf/the_history_of_redd_carbon_planet.pdf)

<sup>17</sup> Carbon Planet, “The History of REDD,” [http://unfccc.int/files/methods\\_science/redd/application/pdf/the\\_history\\_of\\_redd\\_carbon\\_planet.pdf](http://unfccc.int/files/methods_science/redd/application/pdf/the_history_of_redd_carbon_planet.pdf)

<sup>18</sup> Steve Zwick, “Painting the Town REDD,” [http://climate-standards.org/news/news\\_zwick\\_feb2008.html](http://climate-standards.org/news/news_zwick_feb2008.html)

transnational timber companies. While foundation grants are often short-term, REDD project activities generally take place over 20 - 100 years and thus, provide a long-term stream of funding. Such funds can subsequently be directed towards ethnographic studies for the identification of local needs and this could generate health clinics, schools, organic agroforestry and other locally appropriate initiatives. However, REDD does have challenges which are currently being worked through before an international agreement can be reached.

To begin, one of the great challenges of REDD is referred to as leakage. Essentially if a project activity is implemented to reduce the deforestation in a given area, can financiers be assured the GHG reductions are for real or did the deforestation simply take place in another location? To address such an issue, numerous voluntary certification standards require project proponents to take leakage into account and properly incorporate a mitigation plan into their project. Ideally, an international framework would include a global deforestation monitoring body which would be capable of tracking whether REDD projects are in fact reducing net deforestation or whether deforestation is shifting to another location - either within the host country or to another country. This could be done via a combination of satellite imaging, on-the-ground measurements, and a database of the top several hundred firms responsible for large-scale deforestation. Such a task is certainly not easy, but is definitely possible.

When addressing leakage, it is still unclear if deforestation modeling scenarios should be based on a project level (i.e., the surrounding project area's historical and future deforestation), sub-national level (i.e., the deforestation trend of the host State or Province), a national level, or on international level baseline. Such baselines are important because if a project is implemented in a remote area with limited deforestation, but the overall country has a high rate of deforestation, then it is unclear whether the project truly helped reduce deforestation and is thus eligible for carbon reduction credits. Furthermore, countries with high forest cover and low deforestation (HFLD) are critical in terms of their ecosystem services, but could remain outside of the REDD market unless an international level deforestation baseline is established. As an example of leakage's complexity, how can one determine if a given project area is taken out of cultivation in Argentina for conservation purposes and receives REDD financing, but then results in a slight increase of soybean prices which then makes it financially worthwhile for a farmer in Thailand to clear their forests for cultivation? Nevertheless, there are some innovative

techniques being developed to compensate for possible leakage and this will be addressed while examining the Juma Project of Brazil.

Another valid concern with REDD is the accuracy of biomass measurements and the models which establish a baseline scenario of deforestation. Some of these concerns are valid, as different certifications allow for different biomass measurements (e.g., aboveground biomass, belowground biomass, soil carbon, leaf litter and/or dead understory) and to varying statistical levels of confidence. Thus, should technical teams be 90%, 95% or 98% confident in their measurements based off the number of sample plots which were selected? Nevertheless, as voluntary carbon standards consolidate and if an international agreement is reached, a more uniform approach to measuring biomass should be achieved. Case-in-point, this uniform approach for afforestation and reforestation projects has been accomplished via the Clean Development Mechanism's approved methodologies. Furthermore, computer simulation models are becoming more complete in terms of which deforestation variables are being incorporated (e.g., population growth, road construction, agriculture and livestock expansion, etc.) and when determining the amount of carbon reduction credits available from a project, the project proponents ultimately should be conservative.

Other concerns of REDD include: whether local communities are being fairly treated and benefits are equitably shared; corruption; REDD not able to halt deforestation quick enough (i.e., the scalability of REDD); REDD allows GHG emitters to continue polluting while they pay a relative little amount towards forest conservation; the notion of additionality and permanence; or that there are other approaches which can be used. To address the incorporation of local communities, again this is why an internationally transparent, credible certification standard with flexible methodologies (i.e., to specially tailor project to the location) must be developed. In addition, it is vitally important for clear landownership and also ownership rights of carbon reduction credits. Thus, during a trip on behalf of Carbonfund.org in February 2009 to explore Indonesian forestry projects, it was unclear which level of government (i.e., Federal and/or Province-level) and among which federal department(s) (i.e., Forestry, Environment and/or Finance) would share in the proceeds of carbon reduction projects. As a result, NGOs and for-profit developers were unable to understand the risks and benefits of developing projects and how local communities could be compensated. During a similar trip on behalf of

Carbonfund.org in July 2009 to Brazil, it became clear that landownership is difficult to figure out in some countries as titles in Brazil often overlap between federal and state registries, and/or between private lands, indigenous lands, national park systems, and planned infrastructure projects.

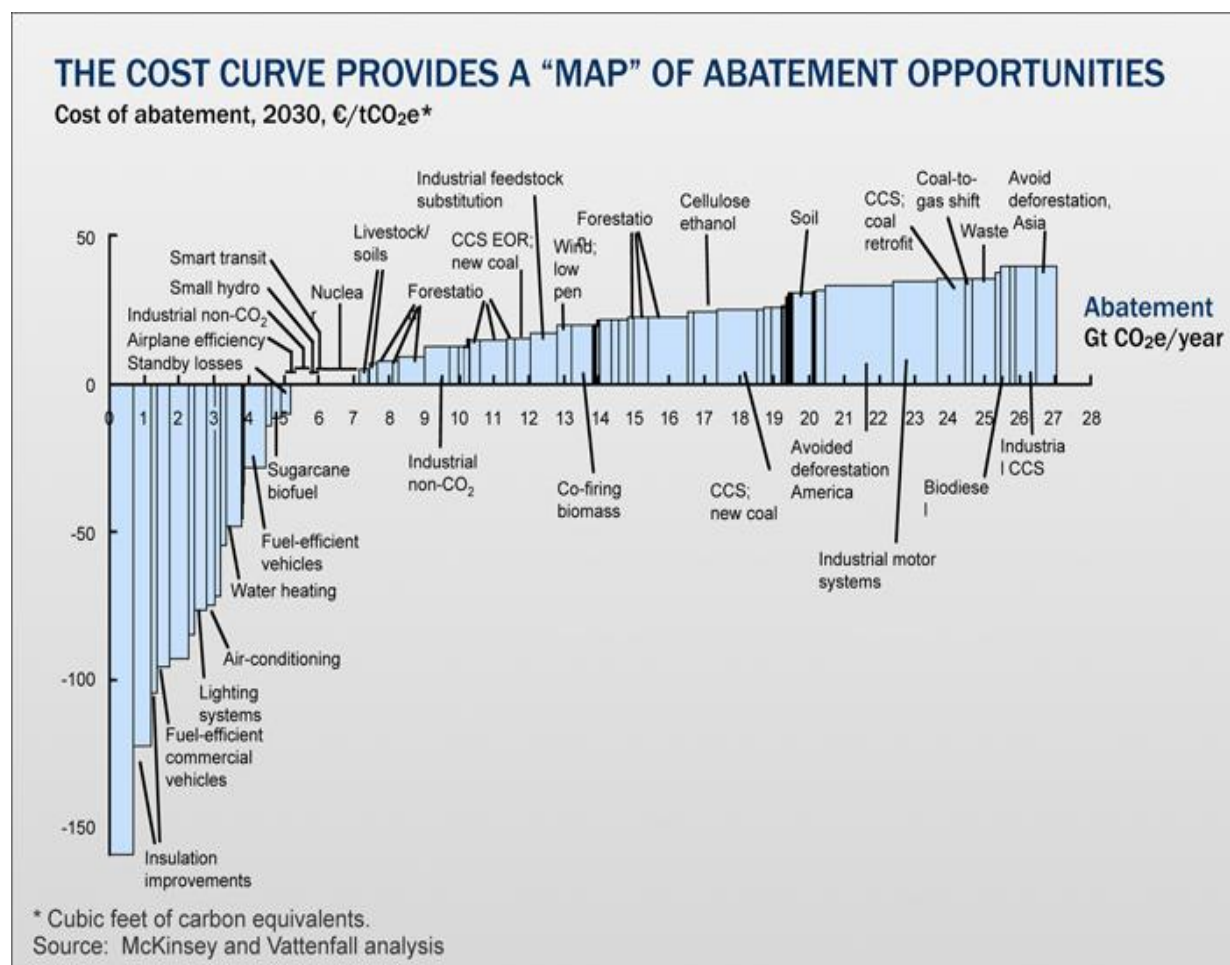
Numerous industries - whether its finance, international trade, construction, or REDD - have instances of fraud and corruption. Perhaps the worst such example for REDD took place in Papua New Guinea where \$100 million of fake, non-certified carbon offset credits were supposedly given to local communities for their support of REDD projects and the country's climate change minister was suspended. Exact details are unclear as the project proponents insist such certificates never entered into trade (i.e., there were no actual buyers or sellers), but were merely a means of explaining the project to communities.<sup>19</sup> This is precisely why an internationally transparent, credible certification standard alongside a robust third party auditing system and regulated exchange system must be established. In addition, it is important to again note that many of the countries with the highest rates of deforestation - both in terms of percentage change and overall net loss of forests - appear to be corrupt, experiencing a conflict, and/or have weak institutions. As will be explained in the subsection entitled, *Carbon Funds: International Institutions and Investors*, organizations such as the World Bank Forest Carbon Partnership and the UN REDD Program are in place to help mitigate such concerns while some legislation being developed in the United States of America require bilateral agreements with project host countries before accepting their REDD carbon reduction credits.

Next, there are groups such as Greenpeace International which are against the use of carbon reduction projects. This is partially because of concerns that large GHG emitters are able to continue polluting while paying a significantly smaller percentage of their net profits to REDD projects for the ensuing carbon reduction credits. However, it is the author's belief that GHG emissions are a classic economic example of an externality and upon being priced, a behavioral change will ensue. In addition, it is too idealistic to believe many large GHG emitting firms will voluntarily undertake GHG reductions which would cost billions of dollars, unless they are compelled to as a result of legislation or regulation. Furthermore, the marginal costs of abatement, with one such model being developed by the consulting firm McKinsey and the

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<sup>19</sup> John Vidal, "UN's forest protection scheme at risk from organized crime, experts warn," <http://www.guardian.co.uk/environment/2009/oct/05/un-forest-protection>

Vattenfall Institute of Economic Research, conveys the message that such large GHG emitters will focus on improving internal operations before securing external carbon reduction credits:



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Another concern with REDD, and carbon reduction projects in general, revolves around the term additionality. Additionality is essentially a test which projects must pass to ensure the activities would not have happened unless it was for the revenue of the carbon reduction credits. This is important because if a project was already exceeding the industry average return on investment or was legally required, then why should this project also be eligible for additional revenue from carbon reduction credits? With this in mind, the two main forms of additionality are legal or regulatory and financial. Nearly all certification standards include some mechanism

<sup>20</sup> McKinsey, “The Carbon Productivity Challenge,”  
[http://www.mckinsey.com/mgi/publications/Carbon\\_Productivity/slideshow/slideshow\\_4.asp](http://www.mckinsey.com/mgi/publications/Carbon_Productivity/slideshow/slideshow_4.asp)



to ensure a project is additional. Thus according to the American Carbon Registry's 2.0 standard, the following guiding questions help determine whether a project is additional and consequently eligible for carbon reduction credits:

#### Regulatory Surplus

Is there an existing law, regulation, statute, legal ruling, or other regulatory framework in effect now or as of the project start date that mandates the project or effectively requires the GHG emissions reductions?      Yes = Fail; No = Pass

#### Common Practice

In the field or industry/sector, is there widespread deployment of this project, technology, or practice within the relevant geographic area?      Yes = Fail; No = Pass

#### Implementation Barriers

Chose one (1) or the following three (3):

##### Financial

Does the project face capital constraints that carbon revenues can potentially address; or is carbon funding reasonably expected to incentivize the project's implementation; or are carbon revenues a key element to maintaining the project action's ongoing economic viability after its implementation?      Yes = Pass; No = Fail

##### Technological

Does the project face significant technological barriers such as R&D deployment risk, uncorrected market failures, lack of trained personnel and supporting infrastructure for technology implementation, or lack of knowledge on practice/activity?

Yes = Pass; No = Fail

## Institutional

Does this project face significant organizational, cultural, or social barriers that the accrual of benefits from a GHG emissions reduction/removal project action will help to overcome? Yes = Pass; No = Fail.<sup>21</sup>

Lastly, the issue of permanence is often cited as a threat to forest-based carbon reduction projects and specifically REDD. This being said, permanence is related to how long the project activities can be maintained and for REDD, how long can the zero or reduced rate of deforestation be ensured? In contrast, projects which involve a solar panel installation or the purchase of a more energy efficient boiler have reasonably accurate, average lifetimes. Thus, if the solar panels are of poor quality, then the project developer can get a manufacturer replacement and the project continues. However, if an unforeseen forest fire or insect infestation destroys the entire REDD project, what happens to the carbon reduction credits which were sold? In some instances permanence is nearly impossible to ensure but numerous projects have this incorporated into legal documents such as contracts, land title amendments, or the placement of a conservation easement on the land. Assuming the host country has a strong commitment to the rule of law, a conservation easement will essentially guarantee the permanence of a project and eliminates any other land-use activity (i.e., timber extraction, mineral exploration or agriculture). Furthermore, there are additional mechanisms being developed to ensure permanence such as: insurance policies (e.g., project developer is paid out if the project is unsuccessful and can purchase carbon reduction credits from another project to satisfy the financier), buffer accounts (i.e., global portfolio of set aside carbon reduction credits which are taken out of circulation and ensures carbon reduction credits are real even if a minority of projects fail) and linked credits (i.e., project developer couples a forestry and non-forestry carbon reduction credit together so if the forestry project fails, at least one carbon reduction credit is still ensured).

In addition to these specific issues with REDD, there are also a range of conflicting views on the topic of global climate change - which will not be addressed in this paper - such as: disbelievers in global climate change and refuters of science; opponents of regulation or

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<sup>21</sup> American Carbon Registry, "The American Carbon Registry Standard 2.0," <http://www.americancarbonregistry.org/carbon-accounting/american-carbon-registry-standards-and-methodologies>

legislation which might harm fossil fuel and manufacturing interests; along with proponents of a carbon tax instead of a cap-and-trade market. With an understating of REDD's promises and problems in mind, the following discussion will now address how international emission trading markets originated before readdressing REDD and the current projects under development.

## **Policy and Market Frameworks of REDD and Climate Change**

Two distinct approaches - being cap-and-trade and carbon taxes - have been developed to address the increasing greenhouse gas emissions including those from deforestation and degradation of the world's forests. Contemporary international REDD markets, along with the greater cap-and-trade and voluntary carbon markets, share many characteristics of the United States of America's Sulfur Dioxide ("SO<sub>2</sub>") Program.

### *History of USA SO<sub>2</sub> and the Emergence of Cap-and-Trade*

The United States of America's SO<sub>2</sub> program was the first ever emissions trading scheme in the world to be implemented. With this in mind, the USA Congress passed the 1970 Clean Air Act (CAA) and on December 2, 1970 the United States Environmental Protection Agency (EPA) was "established to consolidate in one agency a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection. EPA's mission is to protect human health and to safeguard the natural environment - air, water, and land - upon which life depends."<sup>22</sup> The Clean Air Act Amendments of 1990 brought major revisions to environmental policy for the United States of America. According to the EPA, the modified act focused on three major health and environmental hazards: acid rain, urban air pollution, and toxic air emissions. In the 1990 Clean Air Act, there were seven major revisions (i.e., titles) that were addressed: (1) Provisions for Attainment and Maintenance of National Ambient Air Quality Standards, (2) Provisions related to Mobile Sources (3) Air Toxics (4) Acid Deposition Control (5) Permits (6) Stratosphere Ozone and Global Climate Protection and (7) Provisions related to Enforcement.

While each of the seven titles are important, the most relevant to the current policies being formulated in the USA Congress to address global climate change and the potential development

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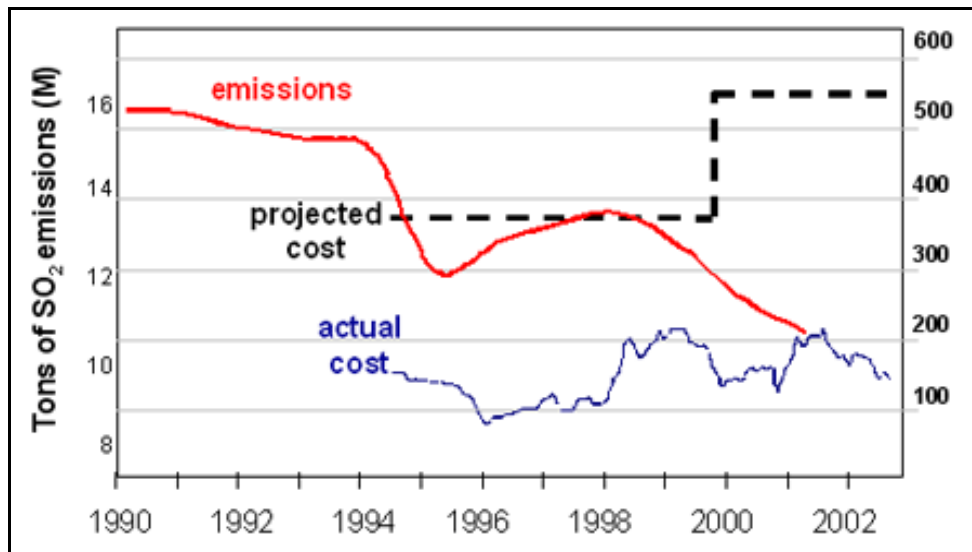
<sup>22</sup> USEPA, "About EPA," Available: <http://www.epa.gov/epahome/aboutepa.htm>

of an international REDD market is Title Four. This being said, approximately 20 million tons of sulfur dioxide is produced in the United States each year and when mixed with nitrogen oxides, this creates acid rain. Acid rain was a significant problem in the Eastern USA and Canada as it damages lakes, forests and buildings, along with reducing visibility and causing negative health effects. Consequently, the Fourth Title called Acid Deposition Control, created two phases: phase one required 110 power plants to reduce emissions to a 1985 - 1987 baseline level starting in 1995, and phase two required 2,000 utilities to the same baseline level of 1985 - 1987. To monitor levels, sources were mandated to install systems to track progress and assure compliance. Allowances were granted to sources, and gave utilities the ability to buy and/or sell allowances among each other. It also required sources to always have adequate allowances or they were subject to a \$2,000 per ton fee and required to offset the emissions the following year. This was the foundation of the cap-and-trade system to address air pollution.<sup>23</sup>

The cap-and-trade system devised for sulfur dioxide accomplished greater reductions in a faster time period with less costs than what was originally predicted. According to research by the Environmental Defense Fund:

### The Acid Rain Experience

“Unprecedented Environmental Protection at Unmatched Cost Efficiency.”<sup>24</sup>



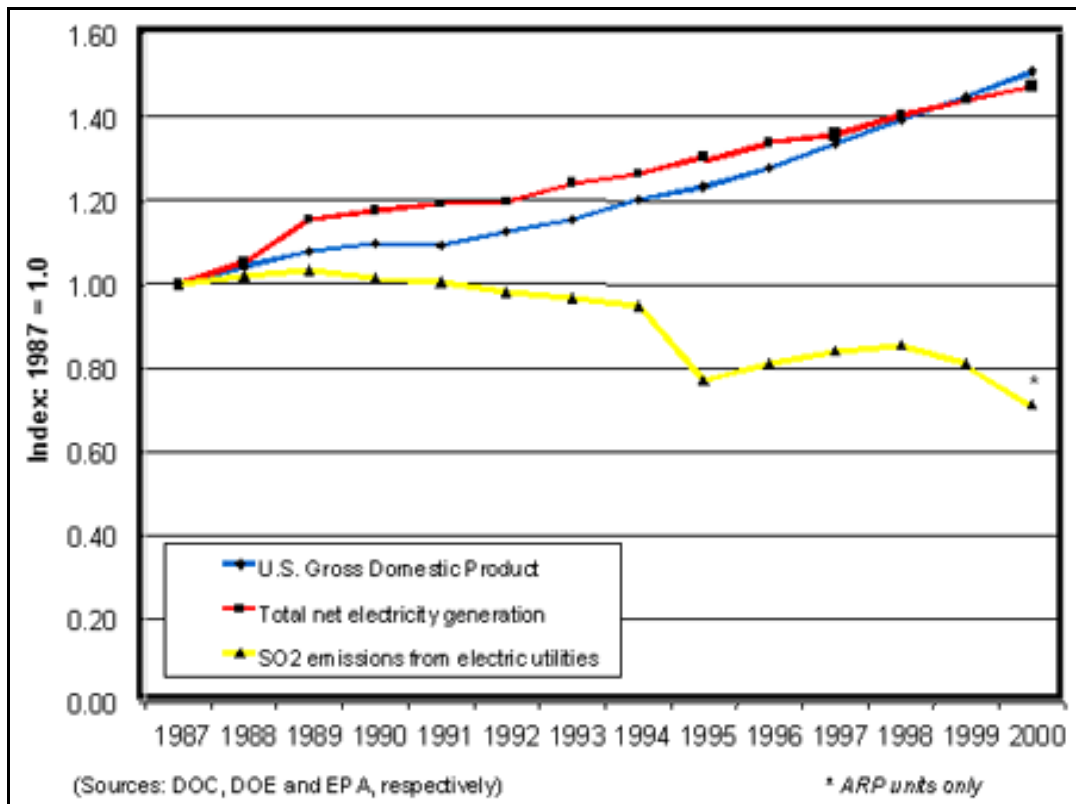
\* Note: The right hand column is in 2000 US dollars

<sup>23</sup> USEPA, “Overview - The CAA Amendments of 1990,” [http://www.epa.gov/air/caa/caaa\\_overview.html](http://www.epa.gov/air/caa/caaa_overview.html)

<sup>24</sup> Environmental Defense Fund, “The Cap and Trade Success Story,” <http://www.edf.org/page.cfm?tagID=1085>

Current sulfur dioxide permits, which were expected to be \$650 - \$850 per metric tonne in 2000 dollars, was trading on Friday, April 9, 2010 at about \$35 - \$45 per vintage year 2009 Sulfur Dioxide permit.<sup>25</sup> While the costs were significantly lower than originally expected and emissions decreased, the following graph also indicates the USA economy was able to grow alongside such legislation.

**Environmental Protection**  
No Longer Environment vs. Economy<sup>26</sup>



One essential question is whether the same model - which was effectively implemented for the gas SO<sub>2</sub> - could be utilized to address GHGs. While SO<sub>2</sub> in the USA largely comes from coal fired power plants in a relatively small geographic area, global climate change is being caused by anthropogenic GHG emissions which come from both a larger sectoral and larger

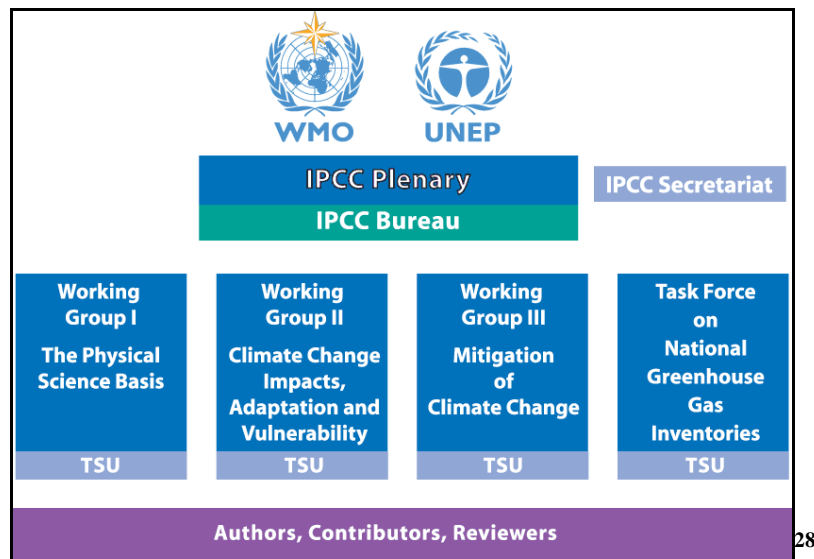
<sup>25</sup> The Chicago Climate Futures Exchange, "CCFE SFI Futures End of Day Summary," [http://www.ccfex.com/mktdata\\_ccfe/futuresSummary.jsf?symbol=sfi](http://www.ccfex.com/mktdata_ccfe/futuresSummary.jsf?symbol=sfi)

<sup>26</sup> Environmental Defense Fund, "The Cap and Trade Success Story," <http://www.edf.org/page.cfm?tagID=1085>

geographic collection of sources. Nevertheless, there is a functioning international compliance carbon market and a voluntary carbon market which operate with a cap-and-trade mechanism.

*The International Compliance Carbon Market*

The Intergovernmental Panel on Climate Change (IPCC) was created in 1989 by the World Meteorological Organization (WMO) and the United Nations Environmental Programme (UNEP) to “to provide the governments of the world with a clear scientific view of what is happening to the world’s climate.”<sup>27</sup>



The IPCC’s findings greatly contributed to the development of the United Nations’ Framework Convention on Climate Change (UNFCCC) which was entered into on March 21, 1994 and was ratified by 192 countries.<sup>29</sup> With the UNFCCC in place, a treaty called the Kyoto Protocol was established as “an international and legally binding agreement to reduce greenhouse gas emissions worldwide, {and} entered into force on 16 February 2005.” Furthermore;

The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions. These amount to an average of five per cent against 1990 levels over the five-year period 2008 - 2012. The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialised countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of ‘common but

<sup>27</sup> IPCC, “History,” [http://www.ipcc.ch/organization/organization\\_history.htm](http://www.ipcc.ch/organization/organization_history.htm)

<sup>28</sup> IPCC, “Structure,” [http://www.ipcc.ch/organization/organization\\_structure.htm](http://www.ipcc.ch/organization/organization_structure.htm)

<sup>29</sup> UNFCCC, “Convention,” [http://unfccc.int/essential\\_background/convention/items/2627.php](http://unfccc.int/essential_background/convention/items/2627.php)

differentiated responsibilities' {...} 184 Parties of the Convention have ratified its Protocol to date. The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh in 2001, and are called the 'Marrakesh Accords'.<sup>30</sup>

Under this treaty, Annex I countries must meet their targets primarily through national measures, but the Kyoto Protocol also offers an additional three market-based mechanisms: Emissions trading (i.e., known as “the carbon market”); the Clean Development Mechanism (CDM); and the Joint Implementation (JI). The Clean Development Mechanism and the Joint Implementation are two project-based certification standards for the generation of either Certified Emission Reductions (CERs) or Emission Reduction Units (ERUs). Under the CDM, an Annex I party can support a project hosted in a non-Annex I country (e.g., Italy could fund a renewable, wind energy project in Turkey or Germany could finance an industrial, fuel-switching project in Brazil) to earn CERs. Under the JI, an Annex I party can support a project in another Annex I country to earn ERUs.

It is also important to note that CERs and ERUs are distinct from Assigned Allowance Units (AAUs), which are permits issued to Annex I countries for the right to pollute one metric tonne of carbon dioxide equivalent emissions (CO<sub>2</sub>e) and European Union Allowances (EUAs) are permits granted under the European Union Emission Trading Scheme (EU ETS) to specific polluting installations for the right to emit one metric tonne of CO<sub>2</sub>e.<sup>31</sup> The country-level distribution of EUAs is outlined by each European Union member in their National Allocation Plans (NAPs). Thus, the compliance emissions trading or carbon market incorporates CERs, ERUs and EUAs and is exemplified by the European Union Emissions Trading Scheme. However, the Kyoto Protocol has had a limited role in bringing forestry carbon projects to market and REDD projects are not eligible. As of February 21, 2010, only 14 out of 2,055 registered projects were afforestation or reforestation projects and currently, neither the CDM nor the JI accepts REDD projects.<sup>32</sup>

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<sup>30</sup> UNFCCC, “Kyoto Protocol,” [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php)

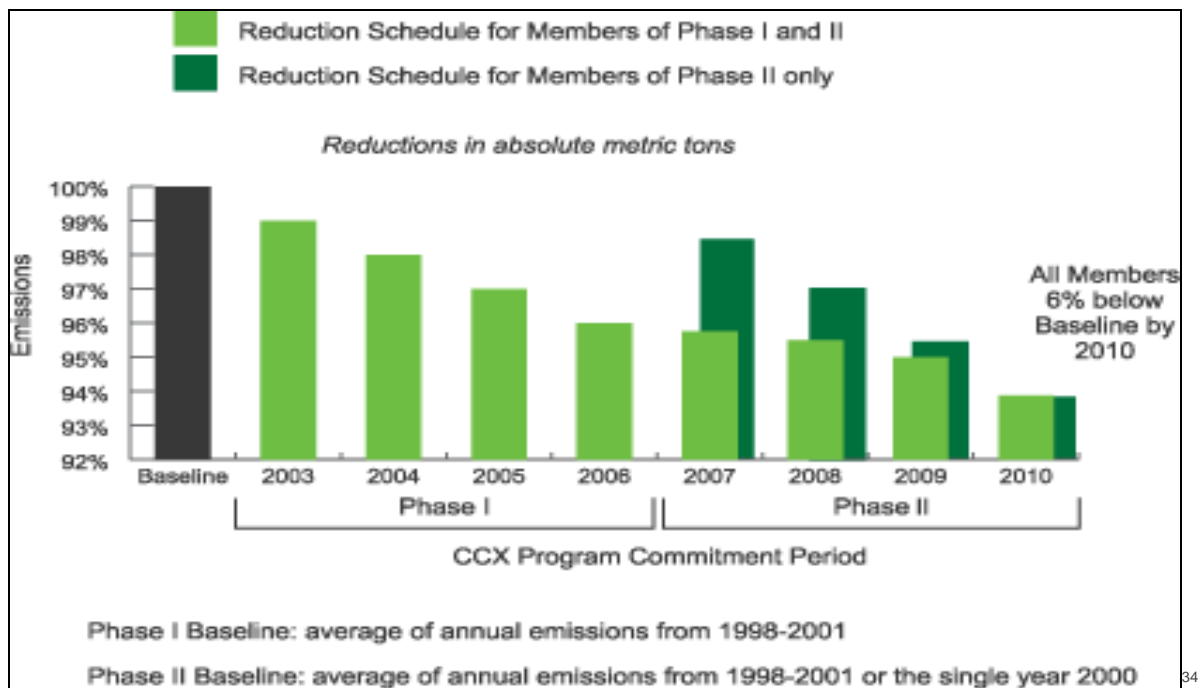
<sup>31</sup> European Climate Exchange, “Glossary,” <http://www.ecx.eu/media/pdf/CarbonGlossary%281%29.pdf>

<sup>32</sup> Clean Development Mechanism, “Project Search,” <http://cdm.unfccc.int/Projects/projsearch.html>

## The Voluntary Carbon Market

Although the USA did not ratify the Kyoto Protocol, the USA developed a robust voluntary, cap-and-trade system which actually preceded the international compliance market and the Kyoto Protocol. The origins of cap-and-trade system for GHGs, while being influenced by the Title Four of the EPA CAA Amendments of 1990, was originally researched and then later founded as the Chicago Climate Exchange (CCX) by Dr. Richard Sandor of the Kellogg Graduate School of Management at Northwestern University in 2000 - 2001. Importantly, the CCX was established by two grants from the Joyce Foundation which at the time, a board seat was held by then Senator and now President, Barack Obama. The CCX, along with the European Climate Exchange (ECX) and the Chicago Climate Futures Exchange (CCFE), is now owned by the UK-based, publicly-traded, parent company The Climate Exchange PLC.<sup>33</sup>

While initial CCX membership is on a voluntary basis, members are legally required after joining to reduce their GHG emissions using a baseline which depends on their level of membership. Thus larger members, such as The Ford Motor Company, DuPont, and Bank of America, are required to reduce their emissions according to the following:



<sup>33</sup> Chicago Climate Exchange, "History," <http://theccx.com/content.jsf?id=1>

<sup>34</sup> Chicago Climate Exchange, "Emission Reduction Commitment," <http://theccx.com/content.jsf?id=72>



Carbon Financial Instruments (“CFIs”) are the unit of trade on the CCX, representing 100 metric tonnes of carbon dioxide equivalent emissions (“CO<sub>2</sub>e), and can be derived from either allowances (i.e., internal reductions made at the facility site) or through supporting project-based reductions called offsets.

As the CCX was the first cap-and-trade system for carbon dioxide emissions, the CCX led to the development of the USA voluntary market and specifically an interconnected system of trading exchanges, registries, validators/verifiers/auditors and certification standards, which has produced a diversity of global carbon reduction projects. It is important to recognize that while each of the certification standards have slightly different features, the key criteria of carbon reduction projects or offsets are characterized as being: real, additional or unique, permanent and verifiable. Furthermore, the general process to generate carbon reduction credits or offsets for the voluntary market is:

- Have land or project ownership and clear rights to carbon offset credits (i.e., a land title - this proves the project is “real”). Rights are less an issue in developed countries with a clear rule of law, but can get complicated in developing countries;
- Conduct prefeasibility (e.g., review past studies and contracts);
- Have full, technical feasibility study conducted (ensures project is “additional” and “verifiable”). Basically a methodology is chosen and a baseline study is conducted to determine how much carbon will be sequestered or mitigated – forestry projects for example depend on soil quality, species and microclimate - leakage (offsite impacts), project permanence and a risk assessment are also addressed;
- Select a certification standard and write up a Project Design Document (PDD);
- Hire an approved auditor to assess PDD and project activities (this helps to ensure the “permanence” of the project);
- If approved, validation statement is granted and carbon reduction credits can be issued onto an approved registry for trading purposes.

Similarly, the current process for a Clean Development Mechanism Project is:

- The summarized version of a PDD is expressed in a Project Idea Note (PIN) document which contains important background information on the project and an estimate of the possible emission reductions;
- The PDD, similar to the voluntary market, contains all information about the project, its impact on local communities, and stipulates the anticipated volume of emission reductions over a certain time period. The PDD, and thus the suggested CDM project, must be authorized through the responsible authorities in the developing country which are known as the Designated National Authority (DNA);
- The PDD and project activities are reviewed by a United Nations accredited organization known as the Designated Operational Entity (DOE) for validation purposes;
- Once validation is achieved, the project developer then prepares an application to register the intended project with the CDM Executive Board. Once the CDM Executive Board agrees, the project is officially registered and CERs can be generated;
- Ongoing Monitoring and Verification of the project activities and PDD;
- Provided that the monitoring reports are approved without objection during the verification, the CDM Executive Board is allowed to issue the generated CERs.

The following voluntary certifications standards, all specifically include forestry projects:

### **The Climate, Community, Biodiversity Alliance Standard (CCBS)**

The CCBS is a project design standard, developed by progressive companies and leading NGOs including CARE International, The Nature Conservancy, Wildlife Conservation Society and Rainforest Alliance, which incorporates community and biodiversity co-benefits into land-use based carbon projects. There is currently - as of April 04, 2010 - a REDD methodology which is going through a public comment period and the CCBS has more REDD projects - which shall all be discussed later and includes the aforementioned Indonesian Ulu Masen Ecosystem project and the Noel Kempff project of Bolivia - than any other certification standard. However it is important to note, the CCBS is not technically a carbon methodology and thus, projects are

frequently developed to the CCBS and an accompanying standard such as the Voluntary Carbon Standard.<sup>35</sup>

### **The Voluntary Carbon Standard (VCS)**

Enacted over 2005 - 2007 by founding partners The Climate Group, The International Emissions Trading Association and The World Business Council for Sustainable Development, the Voluntary Carbon Standard (VCS) is currently the most widely adopted voluntary carbon standard with 48% of the market share in 2008.<sup>36</sup> Voluntary Carbon Units (VCUs) represent one metric tonne of carbon dioxide equivalent (CO<sub>2</sub>e) from VCS certified carbon reduction projects and can be issued on the three VCS approved registries of APX, Markit Environmental Registry, and Cassie des Depots. Currently there are several REDD methodologies going through the dual validation process of being accepted by the VCS but no REDD projects have been certified as of April 04, 2010.<sup>37</sup>

### **The CarbonFix Standard**

The CarbonFix Standard is largely a European version of a voluntary forestry standard and was established in 1999 under German law. While being admitted to the United Nations Environment Programme, the CarbonFix Standard is frequently coupled with certification to the Climate, Community and Biodiversity Standard or the Forest Stewardship Council. Upon review of the CarbonFix Standard version 3.0 and the listed projects, it does not appear as though the CarbonFix Standard allows for REDD or avoided deforestation-type projects.<sup>38</sup>

### **Plan Vivo**

A similar, less-widely used standard is Plan Vivo which currently accepts forestry projects including forest conservation and avoided deforestation. With approximately 15 years of experience, the Plan Vivo standard has received recognition for a diversity of groups such as

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<sup>35</sup> CCBS, "The CCB Standards," <http://climate-standards.org/>

<sup>36</sup> State of the Voluntary Market 2009, page 56

<sup>37</sup> VCS, "Voluntary Carbon Standard," <http://v-c-s.org/>

<sup>38</sup> CarbonFix Standard, "CarbonFix Standard," <http://www.carbonfix.info/>

United Nations Development Programme (UNDP), the World Wildlife Fund (WWF) along with the William J. Clinton and Hunter Foundations.<sup>39</sup>

### **The USEPA Climate Leaders Program**

As of March 25, 2010, there is only one approved project by the USEPA Climate Leaders Program called the Clinton County Landfill Methane Project. While there is a forestry guidance document, there currently is no specific reference to REDD projects.<sup>40</sup>

### **The Climate Action Reserve (CAR)**

The Climate Action Reserve (CAR) is a not-for-profit parent organization which operates the California Climate Action Registry (CCAR), the Center for Climate Action, and the carbon reduction standard called the Climate Action Reserve. CAR only accepts carbon reduction projects from North America, but does have a protocol in place for avoided conversion (i.e., similar to REDD) projects.<sup>41</sup> This is important to note because carbon market participants widely believe that carbon reduction credits certified to the CAR have the best chance for being accepted into USA federal climate legislation.

While the voluntary carbon market has been a driving force for REDD, the overall size of the voluntary market was only 123.4 million metric tonnes of CO<sub>2</sub>e in 2008 as compared to the international compliance market which transacted 4.15 billion metric tonnes of CO<sub>2</sub>e.<sup>42</sup> However, the current and emerging USA compliance carbon markets are also supportive of REDD and this could be a great catalyst to the international REDD project sector.

### *Current and Emerging USA Compliance Carbon Markets*

The Regional Greenhouse Gas Initiative (RGGI) “is the first mandatory, market-based effort in the United States to reduce greenhouse gas emissions. Ten Northeastern and Mid-Atlantic states will cap and then reduce CO<sub>2</sub> emissions from the power sector 10% by 2018.”<sup>43</sup>

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<sup>39</sup> Plan Vivo, “Carbon management and rural livelihoods,” <http://www.planvivo.org/>

<sup>40</sup> USEPA, “Climate Leaders,” <http://epa.gov/climateleaders/>

<sup>41</sup> Climate Action Reserve, “Climate Action Reserve,” <http://www.climateactionreserve.org/>

<sup>42</sup> State of Voluntary Carbon Markets 2009, page 18.

<sup>43</sup> The Regional Greenhouse Gas Initiative, “Home,” <http://rggi.org/home>

As of April 4, 2010, there have been seven auctions in which 100% of the allowances were sold (i.e., all allowances sold and not given away for free, but this does not necessarily mean all the allowances were bought) and raised over \$500 million for member states. To date, an over-allocation of allowances coupled with the recent USA recession and federal legislation uncertainty has put downward pressure on the price of allowances which were recently bought for \$1.86 - \$2.07.<sup>44</sup> Consequently, there has not been RGGI offset projects developed but what is more important is the fact that RGGI only allows for afforestation and not REDD.

In contrast, the second emerging regional compliance carbon market in the USA is known as the Western Climate Initiative (WCI) and is being led by the state of California. With this in mind, the California Air Resources Board (CARB) was formed in 1967 by the California State Government and is operated under the California Environmental Protection Agency.<sup>45</sup> In addition, the California Climate Action Registry (CCAR) was also formed by the California State Government in 2001. The Climate Action Reserve was later formed as a parent not-for-profit organization for: CCAR (i.e., the state government's carbon registry), CAR (i.e., the aforementioned voluntary - possibly pre-compliance - carbon certification standard) and the Center for Climate Action.<sup>46</sup> The parent Climate Action Reserve influenced the creation and passing of the California Global Warming Solutions Act, known as AB-32, in September 2006 which mandates CARB to:

- Adopt cap-and-trade by January 01, 2011;
- Begin cap-and-trade operation by 2012.<sup>47</sup>

As of March 12, 2010, CARB has adopted 4 CAR protocols, but withdrew support on 2/25/10 for the forestry protocols Versions 2.1 & 3.0 in favor of Version 3.1.<sup>48</sup> This is

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<sup>44</sup> The RGGI, "RGGI CO2 Auctions Yield Millions for Investment in Clean Energy, Job Creation," [http://www.rggi.org/docs/Auction\\_7\\_Release\\_MM\\_Report\\_2010\\_03\\_12.pdf](http://www.rggi.org/docs/Auction_7_Release_MM_Report_2010_03_12.pdf)

<sup>45</sup> The California Air Resources Board (CARB), "Introduction," <http://www.arb.ca.gov/html/brochure/arb.htm>

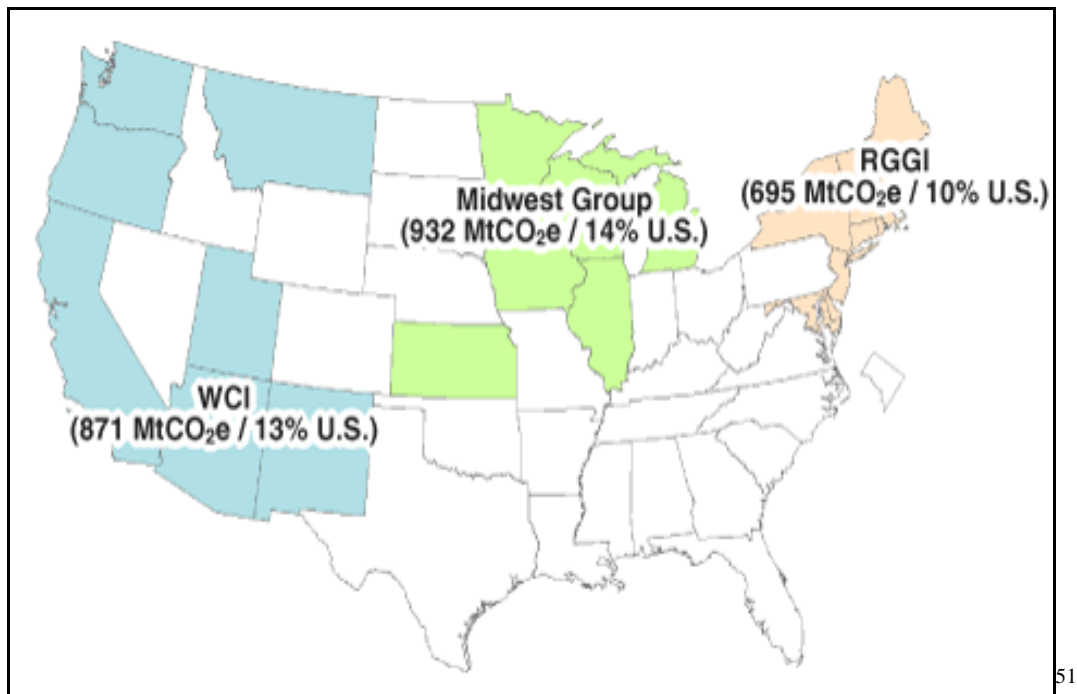
<sup>46</sup> Climate Action Reserve, "About Us," <http://www.climateactionreserve.org/about-us/>

<sup>47</sup> CARB, "Climate Change," <http://www.arb.ca.gov/cc/cc.htm>

<sup>48</sup> CARB, "Resolution 10-22," <http://www.arb.ca.gov/cc/capandtrade/meetings/022510/febresolution.pdf>

significant because such a forestry protocol allows for avoided conversion (i.e., essentially REDD projects) accepted from the USA.<sup>49</sup>

The third emerging regional compliance carbon market in the USA is known as the Midwestern Greenhouse Gas Reduction Accord (Accord). While development is behind the WCI and RGGI, the Accord is important because member states are largely dependent on coal-based power production with large agriculture and manufacturing bases. Members of the Accord include Iowa, Illinois, Kansas, Manitoba, Michigan, Minnesota and Wisconsin with observers including Indiana, Ohio, Ontario and South Dakota. To date, there is still no clarity on accepted carbon reduction projects but with an agricultural base, it would appear as though some type of land-use project would be incorporated.<sup>50</sup>



On the USA federal legislation level, the House of Representatives passed the first ever bill seeking to place a price on GHG emissions. Entitled, *The Clean Energy and Security Act*,

<sup>49</sup> Climate Action Reserve, “Forest Project Protocol, V 3.1,” <http://www.climateactionreserve.org/wp-content/uploads/2009/03/Forest-Project-Protocol-Version-3.1.pdf>

<sup>50</sup> Midwestern Greenhouse Gas Reduction Accord, “Home,” <http://www.midwesternaccord.org/index.html>

<sup>51</sup> World Resources Institute, “Midwestern Greenhouse Gas Accord by the Numbers,” <http://www.wri.org/stories/2007/11/midwest-greenhouse-gas-accord-numbers>

the legislation was largely championed by Representatives Henry Waxman (D-CA) and Edward Markey (D-MA) with “last minute support” from Representative Colin Peterson (D-MN) as the head of the Agriculture Committee and was officially passed on June 26, 2009. Among many important provisions of the bill including capped sectors, time schedule of emission reductions, allowance allocations, energy efficiency and renewable energy standards, there was a specific section on project sectors eligible for carbon reduction credits with direct reference to REDD.<sup>52</sup>

Shortly after the House passage, Senators Barbara Boxer (D-CA) and John Kerry (D-MA) passed out of the Senate’s Environment and Public Works Committee on November 5, 2009 a comparable bill entitled, *The Clean Energy Jobs and American Power Act*. While this proposed bill did not include important details such as allowance allocations and eligible project sectors for carbon reduction credits, Senator Debbie Stabenow (D-MI) introduced an amendment on November 04, 2009 entitled, *The Clean Energy Partnerships Act*. Such an amendment was significant because similar to the House passed bill, there was again language specific to REDD. This being said, the Stabenow Amendment would have allowed for “avoided conversion that would otherwise release carbon stocks; reduced deforestation; management and restoration of peatland or wetland {...} projects to restore or prevent the conversion, loss, or degradation of vegetated marine coastal habitats.”<sup>53</sup> Furthermore, while the US Environmental Protection Agency and the US Department of Agriculture would have oversight of the carbon reduction projects market, the US Agency for International Development would structure bilateral agreements with host countries before accepting their REDD activities.

While the Boxer-Kerry Bill has stalled in the Senate due to an inability to achieve a 60-vote majority, there is another bill being developed. As of April 21, 2010, John Kerry (D-MA), Joseph Liebermann (CT-I) and Lindsey Graham (R-SC) are currently working on a climate change and energy bill which is rumored to be released on April 26, 2010 and would:

- Implement a cap-and-trade among utilities;
- Place a carbon tax on transportation fuels;
- Eventually after 5 - 10 years expand the cap-and-trade to manufacturers;
- Allow for offsets via an incorporation of the Stabenow Amendment;

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<sup>52</sup> US House of Representatives, “H.R. 2454,” [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111\\_cong\\_bills&docid=f:h2454eh.txt.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h2454eh.txt.pdf)

<sup>53</sup> US Senate, “S. 2729,” Available: <http://thomas.loc.gov/cgi-bin/query/z?c111:S.2729>: (Section 104)

- Commit the US to a 17% reduction by 2020 and 80% by 2050 with a 2005 baseline.

## **Current State of REDD**

With a background on the policy and market frameworks of REDD and international climate change in place, this section will now examine the current projects being developed and how the current REDD landscape is being drawn.

### *Overview of Projects*

Due to the fact that the international compliance market does not have a REDD mechanism, all of the following project summaries are currently being designed to voluntary carbon certification standards and have been categorized based on location as of April 1, 2010. In addition the author has chosen to limit the following section to REDD and avoided deforestation projects and to not examine the project types of sustainable forestry management or improved forestry management. Reviewing such projects is important because this helps to explain who is developing REDD projects, the projects' current locations, the certification standards being chosen and the best practices employed which could be incorporated into a compliance market which accepts international REDD projects. This being said, there are a wide variety of project proponents (i.e., not-for-profit, for-profit and government), projects are located on five out of seven continents (i.e., excluding Europe and Antarctica), and the vast majority of projects have been developed according to the Climate, Community and Biodiversity Standard with a possibility of incorporating the Voluntary Carbon Standard if such methodologies are approved. Furthermore, many of these projects are implementing best practices in terms of controlling for leakage, ensuring additionality, promoting community involvement, while collectively there is the potential to conserve over 4.7 million acres.



## NORTH AMERICA

### Avoided Grassland Conversion Project in the Prairie Pothole Region

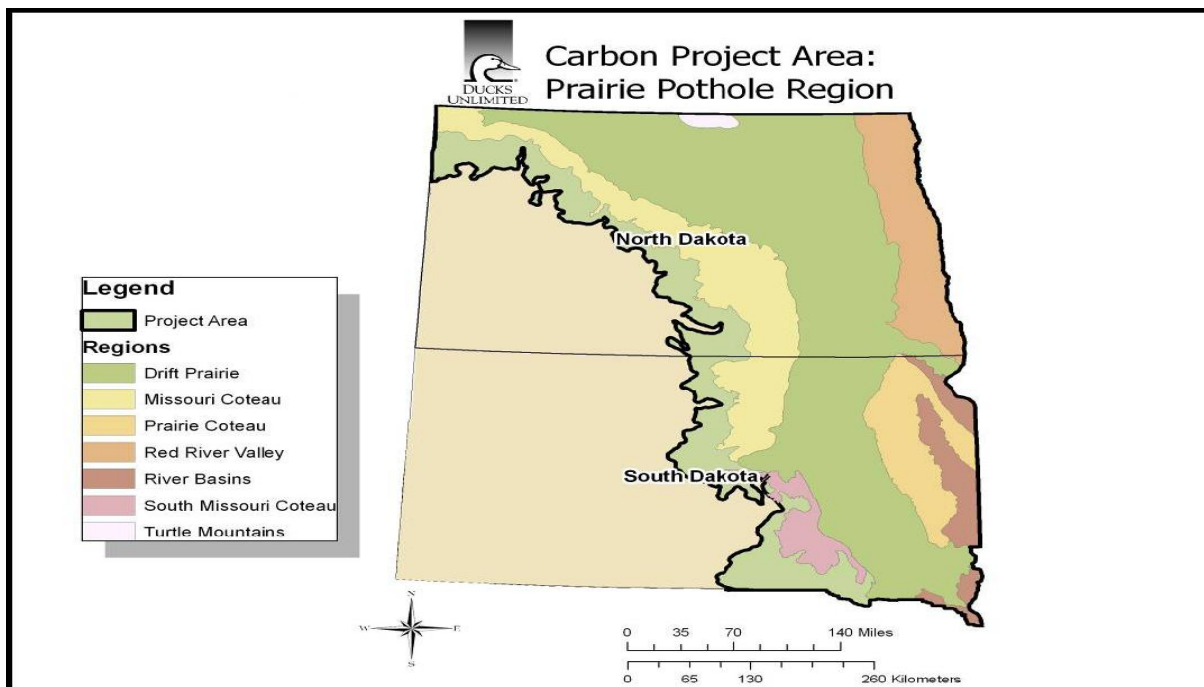
**Location:** North Dakota, the United States of America.

**Size:** 99 year project lifetime seeking to conserve 26,300 acres or 10,648 hectares and prevent the release of 795,777 metric tonnes of CO<sub>2</sub>e. This translates into about 8,038 metric tonnes per year and 75 metric tonnes per hectare (i.e., 30 metric tonnes per acre) over the project lifetime.

**Standard:** The project is currently validated to the Climate, Community and Biodiversity Standard with Gold Distinction.

**Project Proponents:** Ducks Unlimited, New Forests, Equator, LLC, and the US Fish and Wildlife Service.

**Methodologies:** Ducks Unlimited is implementing the project activities which include placing land under conservation easements (i.e., permanence issue addressed) to prevent the spread of agriculture and donating this land to the U.S. Fish and Wildlife Service to incorporate into their National Wildlife Refuge. DU's methodology asserts that "under the baseline scenario, this model predicts that 73.1% of the native prairie grassland in existence today will be lost in the next 99 years." (22)<sup>54</sup>



<sup>54</sup> Ducks Unlimited, "Ducks Unlimited Avoided Grassland Conversion Project in the Prairie Pothole Region," [http://climate-standards.org/projects/files/20090323\\_du\\_agc\\_ccba\\_final\\_for\\_release.pdf](http://climate-standards.org/projects/files/20090323_du_agc_ccba_final_for_release.pdf)

## **Alligator River Avoided Conversion Project**

**Location:** North Carolina, the United States of America

**Size:** There is a 100 year project lifetime, but the specific acreage and projected carbon reduction credits were not publicly available as of April 11, 2010.

**Standard:** The project is currently being validated to The Climate Action Reserve.

**Project Proponents:** Mattamuskeet Ventures 1, LLC; Blue Source; Winrock International.

**Methodologies:** The project proponents have undertaken a conveyance of easement to the United States Department of Agriculture (i.e., very similar to the Ducks Unlimited Project and could be a requirement for REDD projects developed in the USA to ensure permanence). With this in mind the project “area was originally cleared, ditched, drained and used for agriculture {i.e., soybeans, corn and wheat} over 40 years ago. Since then it has been allowed to regenerate to native forest stands consisting of mixed pine and bottomland hardwoods with intermittent selective clearing.” (5)<sup>55</sup> However, a logging concessionary now owns the land and has agreed to not alter the project site.

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<sup>55</sup> Blue Source, “Project Submittal Form,”

[https://thereserve1.apx.com/mymodule/reg/](https://thereserve1.apx.com/mymodule/reg/TabDocuments.asp?r=111&ad=Prpt&act=update&type=PRO&aProj=pub&tablename=doc&id1=497)

[TabDocuments.asp?r=111&ad=Prpt&act=update&type=PRO&aProj=pub&tablename=doc&id1=497](https://thereserve1.apx.com/mymodule/reg/TabDocuments.asp?r=111&ad=Prpt&act=update&type=PRO&aProj=pub&tablename=doc&id1=497)

## **SOUTH AMERICA**

### **The Juma Sustainable Development Reserve Project**

**Location:** Amazonas, Brazil

**Size:** 44 year project lifetime seeking to conserve 589,612 hectares and 189,767,028 metric tonnes of CO<sub>2</sub>e. This translates into 4,312,887 metric tonnes per year and 321.85 tonnes per hectare (130.3 metric tonnes per year) of carbon dioxide over the project lifetime.

**Standard:** The project is currently validated to the Climate, Community and Biodiversity Standard with Gold Distinction.

**Project Proponents:** Amazonas Sustainable Foundation; Secretariat of Environment and Sustainable Development of the Government of the State of Amazonas; State Center for Protected Areas within the Secretariat of Environment and Sustainable Development of the Government of the State of Amazonas; Institute for Conservation and Sustainable Development of Amazonas; and Marriott International, Inc.

**Methodologies:** The Juma project is "...adopting a conservative approach and assuring the benefits of the project, the project commits to reduce 90% of the ongoing deforestation. In this way, the other 10% can be kept as 'security carbon,' in case small areas of deforestation occur inside the Reserve."(81) "The business-as-usual scenario on the baseline is the loss of more than 60% of the Reserve, while the with-project scenario, these areas would be conserved and the forest will be preserved." (83) Essentially, the project developers used the SimAmazonia I model to forecast the future deforestation scenario of the Amazon basin (i.e., sub-national baseline approach) and applied this to a park system in the State of Amazonas. Criticism could be directed towards the fact that deforestation in park systems is often less than deforestation in privately-held areas. Nevertheless, the Juma project has implemented an extensive community development program including education and water-based ambulances. Furthermore, the project's activity area is twice as large as the crediting area (i.e., the area generating carbon reduction credits) and thus if leakage (i.e., deforestation equal to the full crediting area) occurs outside of the project area, the developers can still claim to reduce deforestation (i.e., the remaining project activity area).<sup>56</sup>

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<sup>56</sup> Amazonas Sustainable Foundation, "The Juma Sustainable Development Reserve Project: Reducing Greenhouse Gas Emissions from Deforestation in the State of Amazonas, Brazil," [http://climate-standards.org/projects/files/juma/PDD\\_Juma\\_Reserve\\_RED\\_Project\\_v5\\_0.pdf](http://climate-standards.org/projects/files/juma/PDD_Juma_Reserve_RED_Project_v5_0.pdf)

## **Boden Creek Ecological Preserve Project**

**Location:** Punta Gorda, Toledo District (i.e., nearest city), Belize

**Size:** The project is intended to mitigate the release of 2,007,305 metric tonnes of CO<sub>2</sub>e over the project lifetime of 24 years by conserving 5,211 hectares or 12,876 acres.

**Standard:** Pending Validation and Verification to Climate, Community and Biodiversity Standard and the Voluntary Carbon Standard.

**Project Proponents:** The Conservation Management Institute of Virginia Tech (project monitor), Forest Carbon Offsets, LLC (project developer), MGM International (project broker) Bolden Creek Ecological Preserve (land owner) and Belize Lodge and Excursions (eco tourism operator).

**Methodologies:** The project proponents are ultimately developing a landscape-approach, REDD project which aims to benefit the project site through avoided deforestation activities as well as the offshore coral reef system. Due to the fact sedimentation - which can be caused through deforestation because top soil is more easily washed away during tropical rainstorms - the coral reef system is destroyed as a result of its photosynthetic process being disrupted. In addition, there have been several tracks and photographs on the project site of the endangered jaguar.<sup>57</sup> Without project activities the land would be used for “aquaculture, industrial logging and commercial agriculture according to Belize’s national plans for agriculture and aquaculture development .” (9)



<sup>57</sup> Dr. Jeff Waldon and Gabriel Thoumi, Interview

<sup>58</sup> Forest Carbon Offsets, “Boden Creek Ecological Preserve,” [http://climate-standards.org/projects/files/belize/CCB\\_Gold\\_BCEP\\_Project\\_Design\\_Document\\_ver\\_1\\_021010.pdf](http://climate-standards.org/projects/files/belize/CCB_Gold_BCEP_Project_Design_Document_ver_1_021010.pdf)

## Madre de Dios Amazon REDD Project

**Location:** Madre de Dios, Peru

**Size:** A 20 - 40 year project lifetime which aims to conserve 98,932 hectares and 82,950,966 metric tonnes of carbon dioxide. Depending on the project lifetime, this translates into 2,073,774 to 4,147,548 metric tonnes per year and 838 metric tonnes per hectare over project lifetime.

**Standard:** Climate, Community and Biodiversity Standard with Gold Distinction

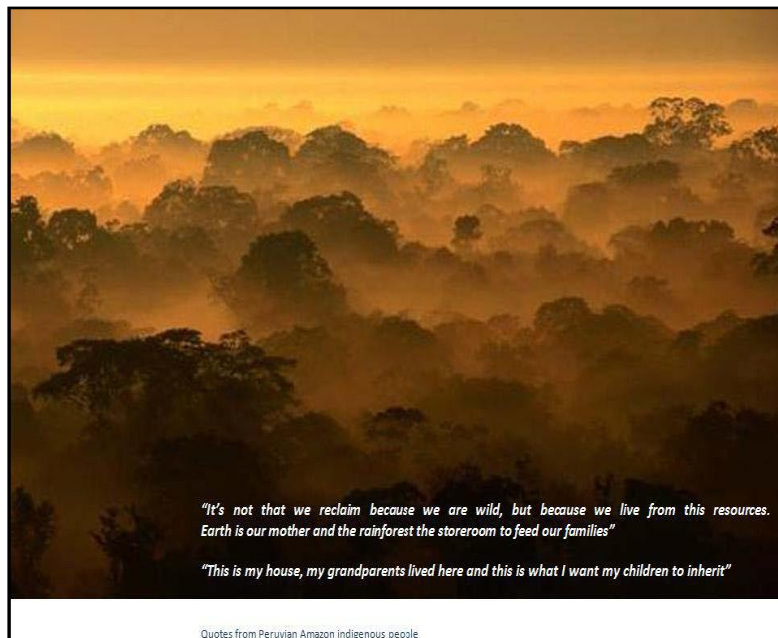
**Project Proponents:** Concession Owners, Greenox (PDD developer), AIDER NGO.

**Methodologies:** The project is being implemented on the timber concessions called “Maderera Río Acre S.A.C” and Maderera Río Yaverija S.A.C” alongside the Transamazon Highway.

This being said, the project area consists of an intact tropical rainforest and the avoided deforestation activities have the following two goals:

- “a) to reduce the pressure for lands with agricultural and cattle ranching purposes by the local population in the project area and its buffer zone;
- b) to guarantee the sustainable forestry management of both timber concessions through the implementation of an avoided deforestation project that helps to generate higher economical resources for the management of the area.” (13)

It appears as though the project developers propose a 100% deforestation scenario and state “it is not possible to project the future deforestation baseline based in the historical deforestation rate, which has oscillated between 0.15 and 0.20% annually.” (81)<sup>59</sup> Thus, future REDD baselines will most likely allow for both historical and future forecasting of deforestation scenarios.



<sup>59</sup> Greenox, “Project Design Document: Madre de Dios Amazon REDD Project,” [http://climate-standards.org/projects/files/madre\\_peru/Madre\\_de\\_Dios\\_Amazon\\_REDD\\_Project\\_REVISED.pdf](http://climate-standards.org/projects/files/madre_peru/Madre_de_Dios_Amazon_REDD_Project_REVISED.pdf)

## **Avoided Deforestation in the Coffee Forest**

**Location:** El Salvador

**Size:** This particular project has a 20 year project lifetime and covers approximately 160,945 hectares and mitigates 6,025,000 metric tonnes of CO<sub>2</sub>e over the project lifetime. As a result, the project proponents estimate about 301,250 tonnes per year and 37.4 tonnes per hectare (15.2 metric tonnes per acre) over the project lifetime.

**Standard:** Pending Validation to Climate, Community and Biodiversity Alliance Standard

**Project Proponents:** Coffee farmers of El Salvador represented by the Salvadoran Coffee Council, the Multisectoral Investment Bank (BMI) and the Foundation for Agricultural Technological Innovation.

**Methodologies:** As explained in the PDD, El Salvador's "economic problems are generated by high indebtedness, caused mainly due to a decrease in coffee prices in the international market, natural disasters such as Hurricane Mitch (1998), earthquakes in 2001, Stan Strom, and the Ilamatepeq volcano eruption (2005)." (2) To help address such economic problems, "the BMI has set up two trust funds, FICAFE and FINSAGRO that aim to help the coffee producers... For the carbon project, BMI has set up a further trust fund, the FIDECAM, which will give an economic incentive to the coffee growers by reducing their yearly costs of debts of FICAFE and FINSAGRO by up to 30%. In turn the growers will assume the commitment of not cutting the forest and maintain the coffee activity, stopping the actual rate of deforestation and change in the use of the coffee forest, avoiding the emission of the GHG of the areas that will not be deforested and keeping the carbon stock inside them." (2)<sup>60</sup> The project is an innovative example of how smaller properties can be aggregated into a larger project.

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<sup>60</sup> Multisectoral Investment Bank, "Project Design Document,"  
[http://climate-standards.org/projects/files/pdd\\_para\\_sgs/ficafe\\_PDD\\_v06.pdf](http://climate-standards.org/projects/files/pdd_para_sgs/ficafe_PDD_v06.pdf)

**Avoided Deforestation Through the Payment of Environmental Services in Rainforests Located on Private Lands in the Conservation Area of the Central Volcanic Mountain Range of Costa Rica**

**Location:** Costa Rica

**Size:** As the first publicly posted REDD project in Costa Rica, this particular project has a 10 year project lifetime. It is important to note, the Voluntary Carbon Standard, the Clean Development Mechanism, the Chicago Climate Exchange and the Climate Action Reserve all required at least 15 years of a project lifetime to ensure permanence. Nevertheless, this project aims to cover 12,000 - 39,522 hectares and 2,276,526 metric tonnes of CO<sub>2</sub>e or approximately 227,652 metric tonnes per year and 57 to 190 tonnes per hectare (23 – 77 metric tonnes / acre) over the project lifetime.

**Standard:** Climate, Community and Biodiversity Alliance Standard with Gold Distinction

**Project Proponents:** Pax Natura, National Biodiversity Institute (INBio), National Forestry Financing Fund (FONAFIFO), and the Foundation for the Development of the Central Volcanic Range (FUNDECOR)

**Methodologies:** “With regard to the projected change in land use obtained with the econometric model developed by Tattenbach et al (2006), in the absence of the (...) project, the area of interest will lose 9,750 hectares in the ten years comprising the 2009 - 2019 period. This represents an annual 3.9% gross deforestation rate for that period.” (23) At an annual rate of - 3.9% annually (i.e., which would be among the top 3 in terms of percentage loss in page 5), this translated into a projected 39% forest loss over the project lifetime of 10 years or 78% if the project was implemented for 20 years. Thus, “in this projection, expected gross deforestation with the project, in the 2009 - 2019 period, is estimated at 4,371 hectares, or an annual 1.6% gross deforestation rate.” (23) By dividing the with-project scenario of 1.6% by the baseline scenario of 3.9%, these results in the continuation of 41% of the deforestation and project proponents intend to slow 59% of the deforestation.<sup>61</sup>

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<sup>61</sup> FUNDECOR, “Programmatic Project for the Payment for Environmental Services,” [http://climate-standards.org/projects/files/costa\\_rica/pax\\_natura\\_english\\_pdd.pdf](http://climate-standards.org/projects/files/costa_rica/pax_natura_english_pdd.pdf)

## **Genesis Forest REDD Project**

**Location:** State of Tocantins, Brazil

**Size:** The project lifetime is 20 years and preserves 1,076.49 hectares and 55,241 metric tonnes of carbon dioxide. This translates into 2,762 tonnes per year and 51 tonnes per hectare (21 metric tonnes per acre) over project lifetime.

**Standard:** Climate, Community and Biodiversity Alliance Standard, Validation On-Hold

**Project Proponents:** Carbonfund.org, Ecologica, CantorCO2e Brazil, Hyundai Motors America

**Methodologies:** “In the absence of the project (baseline) over a period of 20 year, deforestation in the project area would reach 143 hectares, or the equivalent of the emissions avoided from 57,389.55 tons of CO<sub>2</sub> from the atmosphere.” (4) If one divides 143 hectares of prevented deforestation by the total project area of 1,076 hectares, then project proponents have prevented a 13% without project scenario rate of deforestation. Furthermore, the Genesis Forest REDD Project is also coupled with a reforestation project and thus demonstrates how multiple carbon reduction projects can be incorporated into a project location.<sup>62</sup>

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<sup>62</sup> Ecologica, “Genesis Forest Project,”  
[http://climate-standards.org/projects/files/tocantins/ccba\\_pdd\\_tocantins\\_redd\\_v\\_1.pdf](http://climate-standards.org/projects/files/tocantins/ccba_pdd_tocantins_redd_v_1.pdf)



## ASIA

### **Reducing Carbon Emissions from Deforestation in the Ulu Masen Ecosystem**

**Location:** Aceh, Indonesia

**Size:** 30 year Project Lifetime: 750,000 hectares and 101,095,427 metric tonnes of carbon dioxide - 3,369,848 tonnes per year and 134 tonnes per hectare over project lifetime

**Standard:** Validated to Climate, Community and Biodiversity Standard; Silver Distinction

**Project Proponents:** Carbon Conservation, Merrill Lynch, Fauna & Flora International, and the Provincial Government of Nanggroe Aceh Darussalam (Aceh)

**Methodologies:** The project will use “land use planning and reclassification, increased monitoring and law enforcement, reforestation, restoration, and sustainable community logging” in order to “reduce deforestation in the area by 85%.” (2) In addition, the project proponents use IPCC’s National Greenhouse Gas Inventories and four biome-average models (e.g., Houghton, Olson, Achard, and Brown/Gibbs) to estimate the project’s biomass. The project also seeks to:

- “Identify and document opportunities to strengthen land tenure and resource access of forest dependent communities and those with customary rights.
- Identify and document opportunities to strengthen forest management, forest governance and forest law enforcement processes at provincial, district, *Mukim* and village levels.
- Identify and document opportunities for establishing legal and regulatory frameworks to underpin trade in carbon rights and carbon credits.
- Develop provincial, district and *Mukim* level sustainable forest and land use plans, including rezoning Conversion Forest to Protection Forest or Limited Production Forest as appropriate and identifying land for community forest management, reforestation and community agro-forestry.
- Develop the capacity of relevant Provincial Government, educational and scientific institutions to estimate, model and monitor forest and forest carbon stocks through technology transfer and skills development.
- Develop and implement project management, advisory, oversight and consultative structures.
- Coordinate activities with the “Aceh Green” program, an emerging platform to recruit certified, sustainable “soft commodities” such as rubber, cocoa and Forest Stewardship Council timber into degraded areas of Aceh to support livelihoods that are both sustainable and prosperous.” (36)<sup>63</sup>

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<sup>63</sup> Carbon Conservation, “Reducing Carbon Emissions {...},”[http://climate-standards.org/projects/files/Final\\_Ulu\\_Masen\\_CCBA\\_project\\_design\\_note\\_Dec29.pdf](http://climate-standards.org/projects/files/Final_Ulu_Masen_CCBA_project_design_note_Dec29.pdf)

## **Oddar Meanchey REDD Project**

**Location:** Oddar Meanchey Province of Cambodia

**Size:** Project covers approximately 67,853 hectares and is expected to mitigate the release of 7.1 million metric tonnes of CO<sub>2</sub>e.

**Standard:** Pending Validation to Climate, Community and Biodiversity Alliance Standard

**Project Proponents:** Forestry Administration of the Royal Government of Cambodia, Community Forestry International, PACT Cambodia, Technical Working Group on Forests and the Environment, Cambodia, Terra Global Capital, Children’s Development Association, Clinton Climate Initiative, The Buddhist Monk’s Association, and the Communities of Oddar Meanchey Province, Cambodia

**Methodologies:** The project, which incorporates 58 villages and 13 community forestry groups, could provide a model for how to aggregate numerous communities under a single REDD project. With this in mind, “key activities supported under the project include:

- **Social fencing**, Community Forestry Group strengthening, formulation and adoption of management resolution;
- **Networking** with FA triage and with neighboring villages;
- **Strengthening tenurial authority** by mapping and boundary demarcation;
- **Fuel-wood savings** through the introduction of improved cook stoves;
- **Fire control**- fire line construction, fuel load reduction, fire brigade creation;
- **Illegal logging control**- creation of volunteer patrols, forest watchers;
- **Stronger coordination** with Commune, District and Provincial Representatives;
- Creation of **financial incentives** to ensure successful protection;
- Development of annual carbon stock **monitoring** systems;
- **Agricultural intensification.** (Page 5 of Introduction)”

“This analysis found that in Oddar Meanchey Province alone, over 38,594 hectares of forest were cleared between 2002 and 2006, representing approximately 8.4% of the province’s forest area and an annual forest loss rate of 2.1% {...} Forest loss and degradation are driven by illegal logging, fire, (ex-)soldiers and migrant settlers moving into the region and clearing forests for agriculture.” (21)<sup>64</sup>

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<sup>64</sup> Terra Global Capital, “Project Design Document,”

[http://climate-standards.org/projects/files/cambodia/CCB\\_PDD\\_Oddar\\_Meanchey\\_NORMAL\\_RES.pdf](http://climate-standards.org/projects/files/cambodia/CCB_PDD_Oddar_Meanchey_NORMAL_RES.pdf)

## **AFRICA**

### **The Kasigau Corridor REDD Project**

**Location:** Southeastern Kenya

**Size:** The project design document states that for phase I of the project, the project area is 74,516 acres or approximately 30,168.7 hectares. Over the project lifetime of 20 years, the project is expected to mitigate the release of 3,537,719 metric tonnes of CO<sub>2</sub>e or approximately 176,886 CO<sub>2</sub>e per year.

**Standard:** Validated to the Climate, Community and Biodiversity Alliance Standard with Gold Distinction

**Project Proponents:** Wildlife Works, Inc. and Wildlife Works Carbon, LLC, Rukinga Ranching Co. Ltd,

**Methodologies:** The Project provides a corridor between Kenya's Tsavo West and Tsavo East National Parks. In addition, the developers state "it was not difficult to identify the baseline scenario for this project which is rapid deforestation due to unplanned slash and burn agricultural expansion by subsistence immigrants at the frontier of human expansion {...}." (25) The project also establishes an "Ecofactory" to employ 150 local community members for the production of organic cotton clothes. (36)<sup>65</sup>

### **The Nyika and Mkuwazi Forest Conservation Project**

**Location:** Malawi

**Size:** Size of the project is currently unknown.

**Standard:** PIN was approved in 2009 and Validation to Plan Vivo is currently underway.

**Project Proponents:** Malawi Environment Endowment Fund.

**Methodologies:** While this project is publicly listed, there are currently no information or project documents available for download.<sup>66</sup>

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<sup>65</sup> Wildlife Works Carbon, "The Kasigau Corridor REDD Project Phase I – Rukinga Sanctuary," [http://climate-standards.org/projects/files/taita\\_taveta\\_kenya/Rukinga\\_CCB\\_PDD\\_Ver\\_2\\_0.pdf](http://climate-standards.org/projects/files/taita_taveta_kenya/Rukinga_CCB_PDD_Ver_2_0.pdf)

<sup>66</sup> Plan Vivo, "Plan Vivo Project Register," [http://www.planvivo.org/?page\\_id=42](http://www.planvivo.org/?page_id=42)

## **Ankeniheny–Zahamena – Mantadia Biodiversity Conservation Corridor and Restoration**

**Project Location:** Madagascar

**Size:** Approximately 425,000 hectares are expected to be conserved due to the project

**Standard:** Project was developed in accordance to the World Bank’s BioCarbon Fund methodology; it is unclear whether the project meets an independent certification standard

**Project Proponents:** World Bank’s BioCarbon Fund; in addition the project description notes “The project is managed by the Ministry of the Environment of Madagascar, with technical support from the World Bank, Conservation International and ANAE (a local NGO).”

**Methodologies:** “The project is expected to generate substantial community benefits. The promotion of sustainable livelihood activities, such as the wood and fruit garden, would be an alternative to slash-and-burn agriculture (traditional production of tavy-rice) with the potential of substantially increasing the agricultural productivity in the area. These gardens would promote more sustainable production and sale of fuel wood and non-timber forest products. Income from carbon credits is a further incentive for communities to conserve the region’s forests.”<sup>67</sup>

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<sup>67</sup> World Bank, “Madagascar,” <http://wbcarbonfinance.org/Router.cfm?Page=BioCF&FID=9708&ItemID=9708&ft=Projects&ProjID=9638>

## OCEANIA

### Reducing Carbon Emissions by Protecting a Native Forest

**Location:** Tasmania

**Size:** The project lifetime is 25 Years and covers 1,434 hectares and is project to mitigate the release of 179,050 tonnes or 73,824 tonnes of CO<sub>2</sub>e. This is either 2,953 or 7,162 tonnes per year and 51 to 125 tonnes per hectare (21-51 metric tonnes / acre) over the project lifetime.

**Standard:** Validated to Climate, Community and Biodiversity Alliance Standard.

**Project Proponents:** MGM International, REDD Forests Pty Ltd

**Methodologies:** “Proving the commercial viability of using the carbon market to generate income for landowners that will equal or exceed the income from logging and, in so doing, lock up native and old growth forests for a 25-year period free from deforestation and/or degradation” (49) Project proponents have classified the project area in terms of land-use and thus, Class 2: “The land history of this class is either: selective logging of 20% in 1940, selective logging of 50% in 1975, and selective logging of 100% in 2006; or: the land subject to heavy logging in the early history of the farm and not regenerated, in the lower elevations of the central portion of the RFPA” (61). Class 3: “The land history of this class is either: selective logging of 20% in 1940, selective logging of 50% in 1975, and selective logging of 51% in 2006” (63). Class 4: “The history of class 4 land is: selective logging of 20% in 1940, and selective logging of 50% in 1975, with no further logging” (65). (Basically the same for Class 5 as well) Project activities are expected to halt all deforestation and such a detailed classification might be required for REDD projects in the future.<sup>68</sup>

With these projects in mind, it is important to forecast where the next round of REDD projects will be developed, where possible financing will come from and how international policy might influence the potential development of international REDD markets.

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<sup>68</sup> MGM International, “Reducing Carbon Emissions by Protecting a Native Forest in Tasmania,” [http://climate-standards.org/projects/files/tasmania/REDD\\_Forests\\_CCB\\_PDD\\_FINAL\\_071609.pdf](http://climate-standards.org/projects/files/tasmania/REDD_Forests_CCB_PDD_FINAL_071609.pdf)

## The Potential of International REDD Markets

If the United States of America - either through an integrated regional approach or via a federally implemented cap-and-trade system - develops a mechanism to support REDD-based carbon reduction projects, there will be great promise for REDD.

### *Carbon Stocks and Future Project Locations*

In terms of biomass and carbon stocks, the State of the World's Forests 2009 Report was very sparse on information and thus, the following information should be taken relatively lightly. Nevertheless, the two following charts can give an approximate idea of the total biomass in terms of carbon dioxide sequestered in the ecosystem and thus, possibly suggests where future projects will be located. In addition, those countries bolded already have REDD projects being developed:

#### **Top 10 Biomass: Metric Tonnes (Mt) per Hectare (Ha) and Total Biomass<sup>69</sup>**

	<b>Country</b>	<b>Mt of Biomass / Ha</b>		<b>Country</b>	<b>Total Biomass (MMT)</b>
1	Suriname	770	1	<b>Brazil</b>	101,236
2	<b>Madagascar</b>	488	2	Russia Federation	64,419
3	Congo	461	3	DR of Congo	46,346
4	Cote d'Ivoire	386	4	<b>USA</b>	37,929
5	Malta	346	5	Australia	18,510
6	Malaysia	336	6	Colombia	16,125
7	Sao Tome and Principe	336	7	China	12,191
8	Gabon	335	8	<b>Indonesia</b>	11,793
9	Panama	288	9	Suriname	11,383
10	Liberia	287	10	<b>Bolivia</b>	10,568

<sup>69</sup> UN FAO, "Forest growing stock, biomass and carbon," <ftp://ftp.fao.org/docrep/fao/011/i0350e/i0350e04c.pdf>

### Top 10 Carbon: Metric Tonnes (Mt) per Hectare (Ha) and Total Carbon Stocks<sup>70</sup>

	Country	Mt of Carbon / Ha		Country	Total Carbon (MMT)
1	Suriname	385	1	<b>Brazil</b>	49,335
2	<b>Madagascar</b>	244	2	Russia Federation	32,210
3	Congo	231	3	DR of Congo	23,173
4	Cote d'Ivoire	179	4	<b>USA</b>	18,964
5	Malta	173	5	Australia	8,339
6	Malaysia	168	6	Colombia	8,062
7	Sao Tome and Principe	168	7	China	6,096
8	Gabon	167	8	<b>Indonesia</b>	5,897
9	Panama	144	9	Suriname	5,692
10	Liberia	144	10	<b>Bolivia</b>	5,296

When compared to the top ten highest deforesting countries, the following countries are listed both on the top ten biomass, top ten carbon stocks, and top ten deforestation rates (i.e., either in terms of percentage or overall loss): Australia, Brazil, Democratic Republic of Congo, and Indonesia. The next important collection of information to understand where REDD projects will be developed is to see what member countries have joined international REDD associations and what financing mechanisms are becoming available for REDD.

#### *Carbon Funds: International Institutions and Investors*

The two most prominent international institutions for REDD are the United Nations REDD Program and the World Bank Forest Carbon Partnership Facility. The United Nations REDD Program essentially provides in-country technical assistance for monitoring, reporting and verification (MRV) of carbon emissions, along with assisting countries on the development of national REDD plans (i.e., REDD readiness plans). Initial membership included: Bolivia, Democratic Republic of the Congo, Indonesia, Panama, Papua New Guinea, Paraguay, United Republic of Tanzania, Viet Nam and Zambia. In addition, the countries of Argentina, Ecuador, Cambodia, Nepal, Sri Lanka, Costa Rica, Kenya, Mexico, Nigeria, the Philippines, Republic of

<sup>70</sup> UN FAO, "Forest growing stock, biomass and carbon," <ftp://ftp.fao.org/docrep/fao/011/i0350e/i0350e04c.pdf>

Congo, Solomon Islands, and Sudan were granted observer status to the UN-REDD Programme Policy Board.”<sup>71</sup>

Similar to the United Nations REDD Program, the World Bank’s Forest Carbon Partnership Facility includes the following countries with many of the same countries (i.e., those bolded below are members of both institutions) as well as some notable additions:

<b>Argentina</b>	<b>Bolivia, Plurinational State of</b>	Cameroon
<b>Cambodia</b>	Central African Republic	Chile
Colombia	<b>Congo, Democratic Republic of</b>	<b>Congo, Republic of</b>
<b>Costa Rica</b>	El Salvador	Equatorial Guinea
Ethiopia	Gabon	Ghana
Guatemala	Guyana	Honduras
<b>Indonesia</b>	<b>Kenya</b>	Lao People’s Democratic Republic
Liberia	Madagascar	<b>Mexico</b>
Mozambique	<b>Nepal</b>	Nicaragua
<b>Panama</b>	<b>Papua New Guinea</b>	<b>Paraguay</b>
Peru	Suriname	<b>Tanzania</b>
Thailand	Uganda	Vanuatu
		<b>Vietnam</b> <sup>72</sup>

It is also important to note that Ecuador, Nigeria, Philippines, Solomon Islands, Sri Lanka, Sudan and Zambia are a part of the UN-REDD Program, but are not included in the World Bank’s Forest Carbon Partnership Facility. In contrast to the UN REDD Program, the World Bank’s Forest Carbon Partnership Facility has the “dual objectives of building capacity for REDD in developing countries in tropical and subtropical regions, and testing a program of performance-based incentive payments in some pilot countries, on a relatively small scale, in order to set the stage for a much larger system of positive incentives and financing flows in the future.”<sup>73</sup>

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<sup>71</sup> UN REDD Program, “UN-REDD Programme Leaflet,”  
[http://www.unredd.net/index.php?option=com\\_docman&task=doc\\_download&gid=1170&Itemid=53](http://www.unredd.net/index.php?option=com_docman&task=doc_download&gid=1170&Itemid=53)

<sup>72</sup> World Bank’s Forest Carbon Partnership Facility, “Participants,”  
<http://www.forestcarbonpartnership.org/fcp/node/203>

<sup>73</sup> World Bank’s Forest Carbon Partnership Facility, “About the FCPF,”  
<http://www.forestcarbonpartnership.org/fcp/node/12>



With these international institutions in mind, there are also many notable carbon funds which are influencing the development of REDD through financial mechanisms. This includes:

- Norway's International Forest and Climate Initiative;
- The Amazon Fund;
- NGOs such as Carbonfund.org Foundation, Inc., Conservation International, The World Wildlife Fund, The Nature Conservancy
- Private firms such as Marriott International (i.e., funded the Juma Project) or Hyundai (i.e., which intended on funding the Genesis Project)

Furthermore, the World Bank's Carbon Finance Unit has briefly summarized the following carbon funds. While most of these are less relevant to international REDD markets, the BioCarbon Fund has proposed a REDD methodology to the Voluntary Carbon Standard and if the shortcomings of REDD are addressed, it is quite possible the remaining funds will expand their portfolios to be inclusive of REDD.

### **Prototype Carbon Fund**

“A partnership between seventeen companies and six governments, and managed by the World Bank, the PCF became operational in April 2000. As the first carbon fund, its mission is to pioneer the market for project-based greenhouse gas emission reductions while promoting sustainable development and offering a learning-by-doing opportunity to its stakeholders. The Fund has a total capital of \$180 million.”

### **BioCarbon Fund**

“The World Bank has mobilized a fund to demonstrate projects that sequester or conserve carbon in forest and agro-ecosystems. The Fund, a public/private initiative administered by the World Bank, aims to deliver cost-effective emission reductions, while promoting biodiversity conservation and poverty alleviation. The Fund is composed of two Tranches: Tranche One started operations in May 2004, has a total capital of \$53.8 million; Tranche Two was operationalized in March 2007 and has a total capital of \$36.6 million. Both Tranches are closed

to new fund participation. The BioCarbon Fund can consider purchasing carbon from a variety of land use and forestry projects; the portfolio includes Afforestation and Reforestation, Reducing Emissions from Deforestation and Degradation and is exploring innovative approaches to agricultural carbon.

### **Community Development Carbon Fund**

“The CDCF provides carbon finance to projects in the poorer areas of the developing world. The Fund, a public/private initiative designed in cooperation with the International Emissions Trading Association {a founding member of the Voluntary Carbon Standard} and the United Nations Framework Convention on Climate Change, became operational in March 2003. The first tranche of the CDCF is capitalized at \$128.6 million with nine governments and 16 corporations/organizations participating in it and is closed to further subscriptions. The CDCF supports projects that combine community development attributes with emission reductions to create ‘development plus carbon’ credits, and will significantly improve the lives of the poor and their local environment.”

### **Italian Carbon Fund**

“In fall 2003, the World Bank entered into an agreement with the Ministry for the Environment and Territory of Italy to create a fund to purchase greenhouse gas emission reductions from projects in developing countries and countries with economies in transition that may be recognized under such mechanisms as the Kyoto Protocol's CDM and JI. The Fund is open to the participation of Italian private and public sector entities and has a total capital of \$155.6 million.”

### **The Netherlands CDM Facility**

“The World Bank announced an agreement with The Netherlands in May 2002, establishing a facility to purchase greenhouse gas emission reduction credits. The Facility supports projects in developing countries that generate potential credits under the Clean Development Mechanism (CDM) established by the Kyoto Protocol to the UN Framework Convention on Climate Change.”

### **The Netherlands European Carbon Facility**

“The Netherlands, acting through its Ministry of Economic Affairs, the World Bank and the International Finance Corporation (IFC) in August 2004, signed an agreement appointing the World Bank and the IFC as Trustees of the Netherlands European Carbon Facility, in order to purchase greenhouse gas emission reductions for the benefit of the Netherlands. The Facility purchases emission reductions from JI projects only, i.e. from projects located in countries with economies in transition.”

### **Danish Carbon Fund**

“The Danish Carbon Fund (DCF) was established in January 2005 with an initial capitalization of €26.4 million. The full capitalization of the DCF now stands at €90 million. The fund consists of five Participants: the Danish Ministry of Climate and Energy, DONG Energy A/S, Aalborg Portland A.S., Maersk Olie og Gas A.S., and Nordjysk Elhandel A/S.”

### **Spanish Carbon Fund**

“The Spanish Carbon Fund was created in 2004 in an agreement between the Ministries of Environment and Economy of Spain and the World Bank. This fund was established to purchase greenhouse gas emission reductions from projects developed under the Kyoto Protocol to mitigate climate change while promoting the use of cleaner technologies and sustainable development in developing countries and countries with economies in transition. The Fund has a total capital of \$278.6 million.”

### **Umbrella Carbon Facility**

“The UCF is an aggregating facility to pool funds from existing IBRD-managed carbon funds and other participants for the purchase of emission reductions from large projects. The Facility would have multiple tranches, with the First Tranche dedicated to purchasing Certified Emission Reductions (CERs) from the China HFC-23 projects. The Fund has a total capital of \$719 million.”

### **Carbon Fund for Europe**

“The Carbon Fund for Europe (CFE) is designed to help European countries meet their commitments to the Kyoto Protocol and the European Union's Emissions Trading Scheme (EU ETS). The CFE is a trust fund established by the World Bank, in cooperation with the European Investment Bank (EIB). The Fund will purchase greenhouse gas emission reductions through the Kyoto Protocol's Clean Development Mechanism and Joint Implementation from climate-friendly investment projects from either bank's portfolio as well as self-standing projects. While the World Bank brings its expertise and experience of the carbon market to the CFE, the EIB brings its intimate knowledge of the European economy and a rich project pipeline in developing countries. Through the CFE, the two institutions will complement private sector development in the emerging carbon market and seek ways to support essential private carbon market development.”

### **Forest Carbon Partnership Facility**

“Developing and industrialized countries have requested the World Bank to explore a framework for piloting activities that would reduce emissions from deforestation and degradation using a system of policy approaches and performance-based payments. The proposed framework is called the Forest Carbon Partnership Facility.”

### **Carbon Partnership Facility**

“The new proposed Carbon Partnership Facility is designed to develop emission reductions and support their purchase over long periods after 2012. Its objective and business model are based on the need to prepare large-scale, potentially risky investments with long lead times, which require durable partnerships between buyers and sellers.”<sup>74</sup>

While carbon funds will be a critical source of funding, there are also numerous private equity firms, green hedge funds and foundations which are either currently financing clean technology and/or carbon reduction projects and thus, might be more inclined to support REDD projects if the shortcomings of REDD are addressed and there becomes more legislative clarity in the

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<sup>74</sup> World Bank Carbon Finance Unit, “List of Funds,” Available:  
<http://wbcarbonfinance.org/Router.cfm?Page=Funds&ItemID=24670>

United States of America. According to Steven Lawrence, Director of Research for the Foundation Center, the following is a list of the top 25 climate change funders in 2008:

<b>Foundation Name</b>	<b>Amount Given</b>	<b>Grants Given</b>
1. William and Flora Hewlett Foundation	\$548,682,703	91
2. David and Lucile Packard Foundation	\$70,545,985	91
3. Rockefeller Foundation	\$37,255,400	58
4. Kresge Foundation	\$18,095,000	18
5. Lincy Foundation	\$15,000,000	1
6. Skoll Foundation	\$13,060,000	4
7. Robert Wood Johnson Foundation	\$10,556,761	7
8. Sea Change Foundation	\$9,355,000	8
9. John D. and Catherine T. MacArthur*	\$9,306,000	20
10. Richard and Rhoda Goldman Fund	\$8,216,000	54
11. Gordon and Betty Moore Foundation	\$7,550,830	17
12. Ford Foundation	\$7,389,293	37
13. Kendeda Fund	\$7,083,000	20
14. Joyce Foundation	\$6,894,035	19
15. Rockefeller Brothers Fund	\$6,465,580	46
16. California Endowment	\$6,132,499	22
17. Richard King Mellon Foundation	\$5,055,000	2
18. Surdna Foundation	\$4,355,000	40
19. McKnight Foundation	\$3,904,000	6
20. New York Community Trust	\$3,088,000	41
21. Cleveland Foundation	\$3,002,723	27
22. Nathan Cummings Foundation	\$2,931,800	21
23. PG&E Corporation Foundation	\$2,915,000	12
24. Mertz Gilmore Foundation	\$2,790,000	24
25. Doris Duke Charitable Foundation	\$2,657,600	9

It is important to note the John D. and Catherine T. MacArthur Foundation was a funding supporter of the Oddar Meanchey REDD Project in Cambodia. Thus, it is certainly plausible the remaining top 25 foundations might also consider donating specifically to REDD projects. Overall, the top 25 foundations contributed approximately \$812.3 million dollars and a total of 695 total grants.<sup>75</sup>

There are a few private equity groups and green hedge funds which are more focused on financing clean technology, but could expand their financing towards REDD or offer support of REDD if more legislative certainty is revealed. Such firms might include:

- Mission Point Capital
- Mission Markets
- Brennan Investment Partners
- Passport Capital
- CF Partners
- Green Science Partners
- Virid Capital
- Carbon Credit Capital
- The GIC Group

#### *Brief Summary of REDD at COP15 and Projections*

While many participants and observers highlight the shortcomings of the COP15 event in Copenhagen, Denmark during December 2009, there were two significant developments. This includes the increasing involvement of “developing” countries - Brazil, China, India, Indonesia and South Africa - along with the further refinement of an international REDD mechanism. Such REDD negotiations are taking place under the UNFCCC’s Ad Hoc Working Group on Long-term Collaborative Action (AWG-LCA). In addition, the Subsidiary Body for Scientific and Technological Advice (SBSTA) “text reinforces the AWG-LCA text in recognizing the need

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<sup>75</sup> Steve Lawrence, “Climate Change: The U.S. Foundation Response,”  
[http://foundationcenter.org/gainknowledge/research/pdf/researchadvisory\\_climate.pdf](http://foundationcenter.org/gainknowledge/research/pdf/researchadvisory_climate.pdf)

to engage indigenous peoples and local communities and develop guidance for their involvement in monitoring reporting, but falls short of any reference to indigenous peoples' rights. It accepts the Intergovernmental Panel on Climate Change (IPCC) guidelines as the basis for estimating emissions from land-use activities, removals of sinks, forest carbon stocks and forest area changes.”<sup>76</sup> It is important to note the IPCC guidelines were used by many of the voluntary REDD projects including the Reducing Carbon Emissions from Deforestation in the Ulu Masen Ecosystem project. Furthermore, the countries of Australia, France, Japan, Norway, Britain and the United States of America committed US\$3.5 billion over the next three years to specifically address deforestation. According to research by Point Carbon, the REDD market - depending on the development of international REDD negotiations and USA legislation - might reach some of these key levels:

- “Abatement potential from REDD activities could reach 2.65 billion tons CO<sub>2</sub> per year, at a theoretical marginal cost of less than \$4 a ton;
- REDD funding set aside in the US climate bill could be worth \$36 billion and yield 7.7 billion tons CO<sub>2</sub> reductions over the 2012 - 2020 period. These reductions would not count as international offsets for use in compliance markets;
- An extra 1.8 billion cumulative reductions at most could be generated as tradable credits for private sector compliance by 2020, but at a considerably higher marginal cost;
- These offsets would meet no more than 10 per cent of global private demand for credits through 2020 - REDD credits are therefore unlikely to ‘flood’ the international offset market.”<sup>77</sup>

Consequently, there is great potential for REDD and its role with largely rest with the pending USA legislation and the upcoming COP16 in Mexico. This being said, the greatest limitations of this SRP study is the fact that carbon market developments, and specifically REDD, are constantly evolving. Each day new policies unfold and additional projects are being implemented.

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<sup>76</sup> Allison Bleaney, Leo Peskett, David Mwayafu, “REDD-plus after Copenhagen”

<sup>77</sup> Point Carbon, “Forests and the Future”

## Concluding Remarks

As previously mentioned, the initial expectations of this research were:

- Deforestation is increasing over a historical baseline;
- The US voluntary carbon market is the driving force for REDD markets and there are at least 15 REDD projects under development;
- A compliance market in the US will allow for REDD and create immense funding opportunities;
- Both the Senate and House of Representatives' most recent, pending legislation will specifically highlight REDD;
- Current, voluntary REDD projects are being implemented in countries with: stable governmental institutions, the highest rates of deforestation and significant biomass;
- Private investors are willing to commit significant sums of money - totaling over US\$10 billion dollars per year - only if the US develops a compliance market.

It turns out deforestation is certainly increasing in some particular areas and the US voluntary market is the largest driving force for REDD markets. As of April 1, 2010 there appears to be 14 total REDD projects currently under development with their information available to the public. The author knows of a handful of additional projects in the pipeline of various project developers and consequently, this number could be perhaps as high as 20 - 25 REDD projects. Furthermore, it seems as though if a US compliance market is developed, then it will incorporate a REDD mechanism as there was specific language in both the recent Kerry-Boxer legislation (i.e., with Stabenow's Amendment) and the Waxman-Markey legislation which passed the House of Representatives.

### *Questions to Address and Limitations of Study*

While REDD has a great potential to be incorporated into US legislation and channel billions of dollars worth of investments towards preserving tropical forests, there are still many questions which must be addressed. This includes:

- Should deforestation baselines be calculated off the project level, sub-national level, national level or international level?



- To what degree of confidence, should project developers measure a project's biomass in terms of the number of sample plots constructed?
- How will technological developments, particularly the cost and quality of remote sensing and satellite imagery, influence the REDD markets?
- Will the European Union Emission Trading Scheme and/or the United Nations Clean Development Mechanism allow for REDD projects in post-2012 legislation?

The UN REDD program further raises the following questions which the institution is attempting to address:

- How will the REDD mechanism link to existing national development strategies?
- How can forest communities and indigenous peoples participate in the design, monitoring and evaluation of national REDD programmes?
- How will REDD be funded, and how will countries ensure that benefits are distributed equitably among all those who manage the forests?
- How will the amount of carbon stored and sequestered as a result of REDD be monitored?

### *Review of Literature*

In conjunction with interview-based research and unstructured conversations, the following secondary sources were significantly helpful. The most comprehensive guide to the voluntary carbon markets - in terms of market size, pricing of carbon reduction credits, project sectors, certification standards and location of both buyers and sellers - is the joint work by Bloomberg's New Carbon Finance and Forest Trends' Ecosystem Marketplace. This work, which is entitled the State of the Voluntary Carbon Markets, is published on an annual basis and publically available at either New Carbon Finance's website or via Ecosystem Marketplace at:

- <http://carbon.newenergyfinance.com/?p=about&i=freereports>
- [www.ecosystemmarketplace.com/pages/dynamic/our\\_publications.landing\\_page.php](http://www.ecosystemmarketplace.com/pages/dynamic/our_publications.landing_page.php).

In addition, Ecosystem Marketplace provides an assortment of resources on other payment for ecosystem services and New Carbon Finance also includes a plethora of additional free reports. Both organizations also recently published the first State of the Voluntary Forestry Markets which is available at the same websites and is the first such work specifically looking at land-use projects. On a detailed methodological level, the Global Canopy Coalition has published The Little REDD Book in six different languages. Such a work is the most comprehensive guide to the numerous methodologies under development and can be found at:

- <http://www.globalcanopy.org/main.php?m=117&sm=176&t=1>.

The website REDD Monitor (<http://www.redd-monitor.org/>) is an important source which highlights the numerous challenges of REDD and the greater carbon markets. Furthermore, the following sites are publicly available to review projects:

A. Ecosystem Marketplace's Forest Carbon Portal  
<http://www.forestcarbonportal.com/index.php>

B. Climate, Community and Biodiversity Alliance Standard  
<http://climate-standards.org/projects/>

C. Clean Development Mechanism's Project Search  
<http://cdm.unfccc.int/Projects/projsearch.html>

D. The Voluntary Carbon Standard Project Database  
<http://www.vcsprojectdatabase.org/>  
<https://vcsprojectdatabase1.apx.com/myModule/rpt/myrpt.asp?r=111>

E. Pipeline Projects for Plan Vivo  
[http://www.planvivo.org/?page\\_id=87](http://www.planvivo.org/?page_id=87)

F. Current and Upcoming Projects for CarbonFix Standard  
<http://www.carbonfix.info/Project.html?PHPSESSID=9m1gimo1mqnc78qoiaf6aeijk4>

G. The World Bank's Carbon Finance Unit Project Portfolio  
<http://wbcarbonfinance.org/Router.cfm?Page=ProjPort&ItemID=24702>

H. The Climate Action Reserve  
<https://thereserve1.apx.com/myModule/rpt/myrpt.asp?r=111>

## Bibliography

- Amazonas Sustainable Foundation. "The Juma Sustainable Development Reserve Project: Reducing Greenhouse Gas Emissions from Deforestation in the State of Amazonas, Brazil." 29 September 2008. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/juma/PDD\\_Juma\\_Reserve\\_RED\\_Project\\_v5\\_0.pdf](http://climate-standards.org/projects/files/juma/PDD_Juma_Reserve_RED_Project_v5_0.pdf)
- American Carbon Registry. "The American Carbon Registry Standard 2.0." February 2010. Accessed 11 April 2010. Available: <http://www.americancarbonregistry.org/carbon-accounting/american-carbon-registry-standards-and-methodologies>
- Bleaney, Allison, Leo Peskett and David Mwayafu. "REDD-plus after Copenhagen: what does it mean on the ground." January 2010. Accessed 22 April 2010. Available: <http://www.redd-net.org/>
- Blue Source. "Project Submittal Form." September 2009. Accessed 11 April 2010. Available: <https://thereserve1.apx.com/mymodule/reg/TabDocuments.asp?r=111&ad=Prpt&act=update&type=PRO&aProj=pub&tablename=doc&id1=497>
- California Air Resources Board. "Climate Change." Accessed 13 March 2010. Available: <http://www.arb.ca.gov/cc/cc.htm>
- California Air Resources Board. "Introduction to the Air Resources Board." Accessed 13 March 2010. Available: <http://www.arb.ca.gov/html/brochure/arb.htm>
- California Air Resources Board. "'Resolution 10-22.'" 25 February 2010. Accessed 13 March 2010. Available: <http://www.arb.ca.gov/cc/capandtrade/meetings/022510/febresolution.pdf>
- Carbon Conservation. "Reducing Carbon Emissions from Deforestation in the Ulu Masen Ecosystem, Aceh, Indonesia: A Triple-Benefit Project Design Note for CCBA Audit." 27 December 2007. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/Final\\_Ulu\\_Masen\\_CCBA\\_project\\_design\\_note\\_Dec29.pdf](http://climate-standards.org/projects/files/Final_Ulu_Masen_CCBA_project_design_note_Dec29.pdf)
- CarbonFix Standard. "CarbonFix Standard." Accessed 21 February 2010. Available: <http://www.carbonfix.info/>
- Carbon Planet. "The History of REDD." 04 December 2009. Accessed 25 March 2010. Available: Carbon Planet, "The History of REDD," [http://unfccc.int/files/methods\\_science/redd/application/pdf/the\\_history\\_of\\_redd\\_carbon\\_planet.pdf](http://unfccc.int/files/methods_science/redd/application/pdf/the_history_of_redd_carbon_planet.pdf)
- Chicago Climate Exchange. "Emission Reduction Commitment." Accessed 10 February 2010. Available: <http://theccx.com/content.jsf?id=72>

- Chicago Climate Exchange. "History." Accessed 10 February 2010. Available: <http://theccx.com/content.jsf?id=1>
- Chicago Climate Futures Exchange. "CCFE SFI Futures End of Day Summary." 09 April 2010. Accessed 11 April 2010. Available: [http://www.ccfex.com/mktdata\\_ccfe/futuresSummary.jsf?symbol=sfi](http://www.ccfex.com/mktdata_ccfe/futuresSummary.jsf?symbol=sfi)
- Clean Development Mechanism. "Project Search." Accessed 22 February 2010. Available: <http://cdm.unfccc.int/Projects/projsearch.html>
- Climate Action Reserve. "About Us." Accessed 13 March 2010. Available: <http://www.climateactionreserve.org/about-us/>
- Climate Action Reserve. "Climate Action Reserve." Accessed 22 February 2010. Available: <http://www.climateactionreserve.org/>
- Climate Action Reserve. "Forest Project Protocol, Version 3.1." 22 October 2009. Accessed 13 March 2010. Available: <http://www.climateactionreserve.org/wp-content/uploads/2009/03/Forest-Project-Protocol-Version-3.1.pdf>
- Climate, Community and Biodiversity Standards. "The CCB Standards" Accessed 22 February 2010. Available: <http://climate-standards.org/>
- Domask, Dr. Joseph. "International Development and Environment." American University's Washington Semester Program. Lecture. Fall 2004 Semester on 27 September 2004.
- Ducks Unlimited. "Ducks Unlimited Avoided Grassland Conversion Project in the Prairie Pothole Region." March 2009. Accessed 4 April 2010. Available: [http://climate-standards.org/projects/files/20090323\\_du\\_agc\\_ccba\\_final\\_for\\_release.pdf](http://climate-standards.org/projects/files/20090323_du_agc_ccba_final_for_release.pdf)
- Durning, Alan Thein. "Saving the Forests: What Will it Take?" United States of America: Worldwatch Institute, 1993.
- Ecologica. "Genesis Forest Project: Reducing Greenhouse Gas Emissions from Deforestation and Degradation in the State of Tocantins, Brazil." 27 November 2008. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/tocantins/ccba\\_pdd\\_tocantins\\_redd\\_v\\_1.pdf](http://climate-standards.org/projects/files/tocantins/ccba_pdd_tocantins_redd_v_1.pdf)
- Ecosystem Marketplace and New Energy Finance. "State of the Voluntary Carbon Markets 2009." 20 May 2009. Accessed 17 April 2010. Available: [http://www.ecosystemmarketplace.com/documents/cms\\_documents/StateOfTheVoluntaryCarbonMarkets\\_2009.pdf](http://www.ecosystemmarketplace.com/documents/cms_documents/StateOfTheVoluntaryCarbonMarkets_2009.pdf)
- Environmental Defense Fund. "The Cap and Trade Success Story." Accessed 01 February 2010. Available: <http://www.edf.org/page.cfm?tagID=1085>

- European Climate Exchange. "Glossary." Accessed 25 March 2010. Available: <http://www.ecx.eu/media/pdf/CarbonGlossary%281%29.pdf>
- Forest Carbon Offsets. "Boden Creek Ecological Preserve." 27 January 2010. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/belize/CCB\\_Gold\\_BCEP\\_Project\\_Design\\_Document\\_ver\\_1\\_021010.pdf](http://climate-standards.org/projects/files/belize/CCB_Gold_BCEP_Project_Design_Document_ver_1_021010.pdf)
- FUNDECOR. "Programmatic Project for the Payment for Environmental Services: Mitigation of Greenhouse Gas Emissions through Avoided Deforestation of Tropical Rainforests on Privately-owned Lands in High Conservation Value Areas of Costa Rica." March 2009. Accessed 17 April 2010. Available: [http://climate-standards.org/projects/files/costa\\_rica/pax\\_natura\\_english\\_pdd.pdf](http://climate-standards.org/projects/files/costa_rica/pax_natura_english_pdd.pdf)
- Greenox. "Madre de Dios Amazon REDD Project." 02 December 2009. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/madre\\_peru/Madre\\_de\\_Dios\\_Amazon\\_REDD\\_Project\\_REVISED.pdf](http://climate-standards.org/projects/files/madre_peru/Madre_de_Dios_Amazon_REDD_Project_REVISED.pdf)
- Intergovernmental Panel on Climate Change. "History." Accessed 21 February 2010. Available: [http://www.ipcc.ch/organization/organization\\_history.htm](http://www.ipcc.ch/organization/organization_history.htm)
- Lakehead University. "Boreal Forests Overview." Accessed 21 February 2010. Available: [http://www.borealforest.org/index.php?category=world\\_boreal\\_forest&page=overview](http://www.borealforest.org/index.php?category=world_boreal_forest&page=overview)
- Laurence, Dr. William. Interviewed by Ira Flatow. "Talk of the Nation." National Public Radio, 10 June 2005.
- Lawrence, Steve. "Climate Change: The U.S. Foundation Response." February 2010. Accessed 20 April 2010. Available: [http://foundationcenter.org/gainknowledge/research/pdf/researchadvisory\\_climate.pdf](http://foundationcenter.org/gainknowledge/research/pdf/researchadvisory_climate.pdf)
- McKinsey & Company. "The Carbon Productivity Challenge: curbing climate change and sustaining economic growth." Accessed 04 April 2010. Available: [http://www.mckinsey.com/mgi/publications/Carbon\\_Productivity/slideshow/slideshow\\_4.asp](http://www.mckinsey.com/mgi/publications/Carbon_Productivity/slideshow/slideshow_4.asp)
- Melnick, Don J. "Building the Amazon Forest Carbon Partnership." World Bank Headquarters in Washington, DC. Lecture. 08 April 2010.
- MGM International. "Reducing Carbon Emissions by Protecting a Native Forest in Tasmania." 16 July 2009. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/tasmania/REDD\\_Forests\\_CCB\\_PDD\\_FINAL\\_071609.pdf](http://climate-standards.org/projects/files/tasmania/REDD_Forests_CCB_PDD_FINAL_071609.pdf)
- Midwestern Greenhouse Gas Reduction Accord. "Home." Accessed 04 April 2010. Available: <http://www.midwesternaccord.org/index.html>

- Multisectoral Investment Bank. "Project Design Document." 23 September 2008. Accessed 17 April 2010. Available: [http://climate-standards.org/projects/files/pdd\\_para\\_sgs/ficafe\\_PDD\\_v06.pdf](http://climate-standards.org/projects/files/pdd_para_sgs/ficafe_PDD_v06.pdf)
- National Aeronautics and Space Administration's Earth Observatory. "Temperate Deciduous Forests." Accessed 21 February 2010. Available: <http://earthobservatory.nasa.gov/Experiments/Biome/biotemperate.php>
- National Aeronautics and Space Administration's Earth Observatory. "Rainforests." Accessed 21 February 2010. Available: <http://earthobservatory.nasa.gov/Experiments/Biome/biorainforest.php>
- Parker, Larry and John Blodgett, "CRS Report for Congress: Greenhouse Gas Emissions: Perspectives on the Top 20 Emitters and Developed Versus Developing Nations." Accessed 23 February 2010. Available: <http://www.fas.org/sgp/crs/misc/RL32721.pdf>
- Pax Natura. "Programmatic Project for the Payment for Environmental Services: Mitigation of Greenhouse Gas Emissions through Avoided Deforestation of Tropical Rainforests on Privately-owned Lands in High Conservation Value Areas of Costa Rica." March 2009. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/costa\\_rica/pax\\_natura\\_english\\_pdd.pdf](http://climate-standards.org/projects/files/costa_rica/pax_natura_english_pdd.pdf)
- Plan Vivo. "Carbon management and rural livelihoods." Accessed 21 February 2010. Available: <http://www.planvivo.org/>
- Plan Vivo. "Plan Vivo Project Register." Accessed 11 April 2010. Available: [http://www.planvivo.org/?page\\_id=42](http://www.planvivo.org/?page_id=42)
- Point Carbon. "Forests and the Future: The Role of REDD in Global Carbon Markets." 30 September 2009. A Point Carbon Research Publication.
- Powers, William. "Whispering in the Giant's Ear: A Frontline Chronicle from Bolivia's War on Globalization." New York: Bloomsbury Publishing, 2006.
- Terra Global Capital. "Project Design Document: Reduced Emissions from Deforestation and Forest Degradation in Oddar Meanchey Province, Cambodia: A Community Forestry Initiative for Carbon and Biodiversity Conservation and Poverty Reduction." October 2009. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/cambodia/CCB\\_PDD\\_Oddar\\_Meanchey\\_NORMAL\\_RES.pdf](http://climate-standards.org/projects/files/cambodia/CCB_PDD_Oddar_Meanchey_NORMAL_RES.pdf)
- The Regional Greenhouse Gas Initiative. "RGGI CO2 Auctions Yield Millions for Investment in Clean Energy, Job Creation." 12 March 2010. Accessed 04 April 2010. Available: [http://www.rggi.org/docs/Auction\\_7\\_Release\\_MM\\_Report\\_2010\\_03\\_12.pdf](http://www.rggi.org/docs/Auction_7_Release_MM_Report_2010_03_12.pdf)

The Regional Greenhouse Gas Initiative. "The Regional Greenhouse Gas Initiative." Accessed 21 February 2010. Available: <http://rggi.org/home>

Transparency International. "Global Corruption Report 2009." Accessed 21 February 2010. Available: [http://www.transparency.org/publications/gcr/gcr\\_2009](http://www.transparency.org/publications/gcr/gcr_2009)

Transparency International. "Global Corruption Report 2008." Accessed 13 March 2010. Available: [http://www.transparency.org/publications/gcr/gcr\\_2008#7.2](http://www.transparency.org/publications/gcr/gcr_2008#7.2)

United Nations Food and Agriculture Organization. "Table 2: Forest area and area change." Accessed 09 February 2010. Available: <ftp://ftp.fao.org/docrep/fao/011/i0350e/i0350e04b.pdf>

United Nations Food and Agriculture Organization. "Table 3: Forest growing stock, biomass and carbon." Accessed 09 February 2010. Available: <ftp://ftp.fao.org/docrep/fao/011/i0350e/i0350e04c.pdf>

United Nations Framework Convention on Climate Change. "Convention." Accessed 21 February 2010. Available: [http://unfccc.int/essential\\_background/convention/items/2627.php](http://unfccc.int/essential_background/convention/items/2627.php)

United Nations Framework Convention on Climate Change. "Kyoto Protocol." Accessed 10 February 2010. Available: [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php)

United Nations REDD Program. "About REDD." Accessed 25 March 2010. Available: <http://www.un-redd.org/AboutREDD/tabid/582/language/en-US/Default.aspx>

United Nations REDD Program. "UN-REDD Programme Leaflet." Accessed 25 March 2010. Available: [http://www.unredd.net/index.php?option=com\\_docman&task=doc\\_download&gid=1170&Itemid=53](http://www.unredd.net/index.php?option=com_docman&task=doc_download&gid=1170&Itemid=53)

United States Environmental Protection Agency. "About EPA." Accessed 10 February 2010. Available: <http://www.epa.gov/epahome/aboutepa.htm>

United States Environmental Protection Agency. "Climate Leaders." Accessed 21 February 2010. Available: <http://epa.gov/climateleaders/>

United States Environmental Protection Agency. "Overview - The Clean Air Act Amendments of 1990." Accessed 10 February 2010. Available: [http://www.epa.gov/air/caa/caaa\\_overview.html](http://www.epa.gov/air/caa/caaa_overview.html)

United States House of Representatives. "H.R. 2454." 26 June 2009. Accessed 13 March 2010. Available: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111\\_cong\\_bills&docid=f:h2454eh.txt.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h2454eh.txt.pdf)

- United States Senate. "S. 2729." 04 November 2009. Accessed 13 March 2010. Available: <http://thomas.loc.gov/cgi-bin/query/z?c111:S.2729>:
- Vidal, John. "UN's forest protection scheme at risk from organized crime, experts warn." *The Guardian*. 05 October 2009. Accessed 04 April 2010. Available: <http://www.guardian.co.uk/environment/2009/oct/05/un-forest-protection>
- Voluntary Carbon Standard. "Voluntary Carbon Standard." Accessed 22 February 2010. Available: <http://v-c-s.org/>
- Walden, Dr. Jeff and Gabriel Thoumi. Personal Interview. 06 April 2010.
- Wildlife Works Carbon. "The Kasigau Corridor REDD Project Phase I – Rukinga Sanctuary." 22 December 2009. Accessed 04 April 2010. Available: [http://climate-standards.org/projects/files/taita\\_taveta\\_kenya/Rukinga\\_CCB\\_PDD\\_Ver\\_2\\_0.pdf](http://climate-standards.org/projects/files/taita_taveta_kenya/Rukinga_CCB_PDD_Ver_2_0.pdf)
- Wilson, E.O. "The Creation: An Appeal to Save Life on Earth." New York: W.W. Norton and Company, 2006.
- World Atlas. "The List." Accessed 21 February 2010. Available: <http://www.worldatlas.com/geoquiz/thelist.htm>
- World Bank Carbon Finance Unit. "List of Funds." Accessed 17 April 2010. Available: <http://wbcarbonfinance.org/Router.cfm?Page=Funds&ItemID=24670>
- World Bank Carbon Finance Unit. "Madagascar: Ankeniheny–Zahamena – Mantadia Biodiversity Conservation Corridor and Restoration Project." Accessed 20 April 2010. Available: <http://wbcarbonfinance.org/Router.cfm?Page=BioCF&FID=9708&ItemID=9708&ft=Projects&ProjID=9638>
- World Bank's Forest Carbon Partnership Facility. "About the Forest Carbon Partnership Facility." Accessed 21 April 2010. Available: <http://www.forestcarbonpartnership.org/fcp/node/12>
- World Bank's Forest Carbon Partnership Facility. "Participants." Accessed 25 March 2010. Available: <http://www.forestcarbonpartnership.org/fcp/node/203>
- World Resources Institute. "Midwestern Greenhouse Gas Accord by the Numbers." 21 November 2007. Accessed 04 April 2010. Available: <http://www.wri.org/stories/2007/11/midwest-greenhouse-gas-accord-numbers>
- Zwick, Steve. "Painting the Town REDD: Merrill Lynch Inks Massive Voluntary Forest Deal." 11 February 2008. Accessed 25 March 2008. Available: [http://climate-standards.org/news/news\\_zwick\\_feb2008.html](http://climate-standards.org/news/news_zwick_feb2008.html)



## Appendix A: Acronym Reference

AQCRs	Air Quality Control Regions
BACM	Best Available Control Measures
CAA	Clean Air Act
CAR	Climate Action Reserve
CARB	California Air Resources Board
CCAR	California Climate Action Registry
CCBS	Climate, Community and Biodiversity Standards
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CFI	Carbon Financial Instrument
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
COP15	Conference of the Parties (15 <sup>th</sup> such meeting of UNFCCC)
DNA	Designated National Authority
DOE	Designated Operational Entity
EU ETS	European Union Emission Trading Scheme
FAO	Food and Agriculture Organization (of the UN)
GHG	Greenhouse Gasses
HFLD	High Forest Cover and Low Deforestation
JI	Join Implementation
IPCC	Intergovernmental Panel on Climate Change
NAAQS	National Ambient Air Quality Standards

PDD	Project Design Document
REDD	Reduced Emissions from Deforestation and Degradation
SO <sub>2</sub>	Sulfur Dioxide
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
VCS	Voluntary Carbon Standard
VER	Verified Emission Reduction
WCI	Western Climate Initiative
WMO	World Meteorological Organization