

Forests:

Taking Root in the Voluntary Carbon Markets

Introduction

Over the past year, the term 'REDD' (reduced emissions from deforestation and degradation) has risen from obscure acronym to hot-button issue for policymakers, conservation groups, investors and academics across the globe, with good reason. According to the Intergovernmental Panel on Climate Change (IPCC), land use change accounts for approximately 20% of global greenhouse gas emissions—more emissions than the transportation sector world-wide. Most of these emissions are the result of deforestation driven by demand for agriculture and timber. In response to rapid deforestation, stakeholders are aggressively sculpting policy and market tools to incentivize REDD or 'avoided deforestation' projects.

While the role of REDD in both the international and emerging US regulated systems is being hammered out, the voluntary carbon markets are serving not only as a testing ground for the development of REDD carbon credits, but also building up expertise and generating immediate action. This publication is designed to introduce practitioners to the carbon markets, in particular the voluntary markets, and the current climate for reforestation, afforestation and REDD projects generating carbon credits. It is a collection of articles and one book chapter commissioned by the Ecosystem Marketplace (www.ecosystemmarketplace.com).

The Ecosystem Marketplace is a web-based, non-profit information service created three years ago to help spur the development of environmental markets worldwide. It is a leading source of information on markets and payments for ecosystem services such as water quality, carbon sequestration, and biodiversity. The organization is built on the belief that by providing reliable information on prices, regulation, science, and other market-relevant factors, markets for ecosystem services will one day become a fundamental part of our economic system, helping give value to environmental services that, for too long, have been taken for granted. The Ecosystem Marketplace is a project of the DC-based non-profit Forest Trends.

These articles were compiled to serve as context and provide background for the Tanzania Katoomba conference, held in Dar-es-salaam, Tanzania from September 16-18, 2008. The conference is the thirteenth in a series of Katoomba conferences designed to stimulate and strengthen environmental markets around the world.

Launched in Katoomba, Australia, in 1999, the Katoomba Group is an international working group composed of leading thinkers and practitioners from academia, industry and government, all committed to enhancing the integrity of ecosystems through market solutions that are efficient, effective and equitable. The group is a sister project of the Ecosystem Marketplace and is also sponsored by Forest Trends.

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Bird's Eye View: An Introduction to the Carbon Markets

The Big Picture: Chapter 1 of Voluntary Carbon Markets, 2nd edition

A Business Guide to What They Are and How They Work

by **Ricardo Bayon, Amanda Hawn, and Katherine Hamilton**

In 2005, Kerry Emanuel, a professor of atmospheric science at MIT, published a controversial paper in Nature linking global warming with the rising intensity of hurricanes. (Emanuel, 2005) The paper relied on historical records showing the intensity of Atlantic storms had nearly doubled in 30 years. What caught people's attention, however, was not this alarming statistic, but rather that it was released just three weeks before Hurricane Katrina displaced 1 million people and left an estimated 1,836 dead.

For hurricane watchers, 2005 was indeed a year for the record books. A startling number of hurricanes hit the Gulf of Mexico, causing over US\$100 billion in damages. The 2004 hurricane season was a bit less horrific in terms of raw numbers, but what it lacked in quantity, it made up for in oddity. The year was marked by an event some believed to be a scientific impossibility—a hurricane in the southern Atlantic Ocean. For over 40 years, weather satellites circling the globe have seen hurricanes and cyclones in the northern Atlantic, and on both sides of the equator in the Pacific, but never in the southern Atlantic—until 2004. On 28 March, Hurricane Catarina slammed into Brazil, suggesting that recent weather patterns are starkly different from those of the 20th century.

On 28 March, 2005, Hurricane Catarina slammed into Brazil, suggesting that recent weather patterns are starkly different from those of the 20th century.

What is going on? Are these freak occurrences or signs of something bigger?

In 2008, Kerry Emanuel again sought answers to these questions. This time, however, the team of scientists he led used a completely different approach. Instead of using historical records, they worked with Global Circulation Models that scientists around the world now use to help forecast the effects of climate change under different conditions. The models, says Emanuel, do not explain the

real world pattern perfectly, but they do show one thing without a doubt: “The idea that there is no connection between hurricanes and global warming, that’s not supported” (Emanuel et al, 2008).

While there is no level of data or anecdote that that will satisfy hardened skeptics, many scientists now believe, like Emanuel, that the increasing intensity of storms over the Atlantic are merely symptoms of a bigger problem: global climate change. As the Earth’s average temperature grows warmer, they say, atmospheric and oceanic patterns are beginning to shift, fueling increased storms and unusual weather events.

Temperatures at the planet’s surface increased by an estimated 1.4 degrees Fahrenheit (°F) (0.8 degrees Celsius (°C)) between 1900 and 2005. The past decade was the hottest on record during the last 150 years, with 2005 being the warmest year on record (NASA, 2007).

Again, skeptics argue that this is part of the natural variability in the Earth’s temperature, but the majority of scientists now agree that it is more likely due to increased concentrations of heat-trapping greenhouse gases (GHGs) in the atmosphere. The U.S. National Oceanic and Atmospheric Administration (NOAA) reported that carbon dioxide (CO₂), the most common GHG, is increasing at ever faster rates. Between 1970 and 2000, CO₂ concentrations rose at an average annual rate of 1.5 parts per million (ppm). That average has ticked upward to 2.1 ppm since 2000, and in 2007 the mean growth rate was 2.14 ppm. Atmospheric CO₂ levels are now higher than they have been for at least the last 650,000 years. (NOAA, 2008)

BOX 1.1 A Look at the Science

Prior to the industrial revolution of the 18th and 19th centuries, the atmospheric concentration of carbon dioxide (CO₂) was approximately 280 parts per million (ppm). Today, the atmospheric concentration of CO₂ has risen to 387 ppm (NOAA, 2008), largely because of anthropogenic emissions from the burning of fossil fuels used in transportation, agriculture, energy generation and the production of everyday materials. The loss of natural carbon sinks (places where carbon is pulled out of the atmosphere and trapped either in geological formations or in biological organisms) – on land and in the ocean – is also contributing to increased levels of carbon dioxide in the atmosphere.

The rapid rise in concentration of CO₂ in the atmosphere concerns scientists because CO₂ is a greenhouse gas. GHGs allow sunlight to enter the atmosphere, but they keep the heat released from the Earth’s surface from getting back out.

While recent trends show a gradual warming trend of the Earth’s surface, some scientists fear future climate change will not be linear.

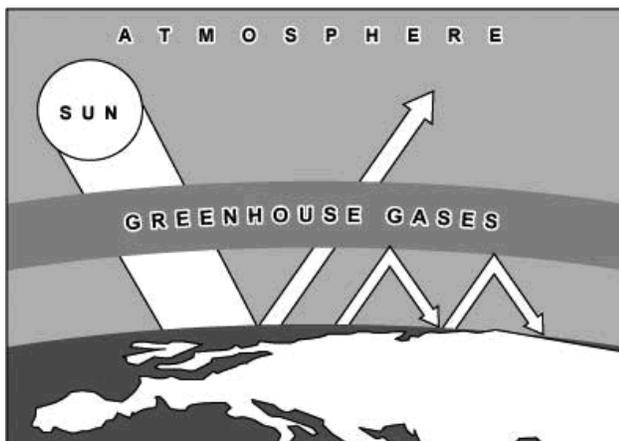
‘The Earth’s system’, says Wallace Broecker, Newberry Professor of Earth and Environmental Sciences at Columbia University, ‘has sort of proven that if it’s given small nudges, it can take large leaps. By tripling the amount of carbon dioxide in the atmosphere, we are giving the system a huge nudge’ (Hawn, 2004).

The 'large leaps' to which Broecker refers are better known as 'abrupt climate changes' in the world of science. Over the course of thousands of years, such changes have left geological records of themselves in ice cores and stalagmites. These records show that past temperature swings on our planet have been as large as 18°F (7.8°C) and have occurred over time scales as short as two years.

Using the analogy of a car moving along an unknown road at night, Klaus Lackner, a geophysicist at Columbia University, argues that our incomplete understanding of the natural system is no excuse for delaying action: 'We sort of vaguely see in the headlights a sharp turn. There are two possibilities.

You can say: 'I'm going to ignore that and keep going at 90 miles an hour because you cannot prove to me that the curve is not banked and therefore I might make it...or you can put on the brakes' (Hawn, 2004).

Figure 1.1 The Greenhouse Effect



Source: Pew Center on Global Climate Change. (2001)
 'The greenhouse effect,' in Claussen, E. et al (ed)

Noting that there could be an oil slick and no bank to the road, Lackner says the good news is that we have the technology to put on the brakes. He adds, however, that if we want to stabilize the amount of CO₂ in the atmosphere at double the natural level (roughly 500ppm, which still might leave us with an ice-free Arctic Ocean), we have to start now (Hawn, 2004). The most recent report from the Intergovernmental Panel on Climate Change (IPCC) concluded that "greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century" (IPCC, 2007).

Market Theory

To start towards stabilized levels of atmospheric CO₂, climate policy makers argue that we not only need to prime the research pump behind clean energy technologies and emission reduction strategies; we also must generate the market pull for them.

Enter the global carbon market. Many think markets for emissions reductions are among the most innovative and cost-effective means society has of creating a market pull for new clean energy technologies while, at the same time, putting a price on pollution and thereby providing incentives for people to emit less.

The theory is that carbon markets are able to achieve this magic because they help channel resources toward the most cost-effective means of reducing greenhouse gas emissions. At the same time, they punish (monetarily) those who emit more than an established quota, and reward

(again, monetarily) those who emit less. In so doing, they encourage people to emit less and change the economics of energy technologies, making technologies that emit less carbon more competitive vis-a-vis their carbon-intensive counterparts.

There is other magic at work as well. By turning units of pollution into units of property, the system makes it possible to exchange pollution from Cape Town with pollution from Cape Cod. If business managers find reducing their company's emissions too costly, they can buy excess reductions from a facility where reductions are less expensive. The bigger the market, the theory goes, the greater the likelihood that efficiencies will be found.

By aggregating information about the value of carbon allowances, the market is sending signals to potential polluters. In a world where pollution has no price, the default decision will always be to pollute, but in a world where pollution has a financial cost, the decision is no longer easy. In today's European emissions market, for instance, emitting 1 tonne of CO₂ has in the past cost polluters anywhere from €7.02 up to €32.85. Polluters suddenly must consider a new suite of options: do they accept the cost of added pollution, change fuel mixes or simply conserve energy?

The term carbon market refers to the buying and selling of emissions permits that have been either distributed by a regulatory body or generated by GHG emission reductions projects.

Once markets take shape, emitters have a variety of options available to them. If they believe they can reduce emissions cheaply by changing production processes or experimenting with new technologies, they have an incentive to do so. If they believe they can change their production process, but that this will take time, emitters can purchase credits up front in the hopes that they will be able to make them back through the use of emissions reduction technologies down the line. If, on the other hand, emitters believe they will emit more in the long run, they can buy credits now (or options on credits once secondary markets develop) for use later. In short, the system enables the trading of emissions across temporal as well as geographic boundaries— a basic benefit of markets.

The market-based approach also allows other, third-party players such as speculators to enter the fray. By agreeing to take on market risks in exchange for possible paybacks, speculators assume the risks that others are either unwilling or unable to shoulder. Other interested parties also can get involved. If, for example, an environmental group wants to see emissions decrease below a regulated target, they can raise money to buy and retire emissions allowances. This drives up the cost of emissions and can force utilities to become more efficient.

It is, of course, important to note that some people dispute the net gain of this approach, and others feel that markets allow companies to 'greenwash' previously tarnished environmental reputations without changing their behaviour in important ways. 'Carbon offsets are based on fictitious carbon accounting, and can by themselves not make a company carbon neutral,' argues Larry Lohmann of The Corner House, a UK-based nongovernmental organization (NGO). 'The practice of offsetting is slowing down innovation at home and abroad and diverting attention away from the root causes of climate change' (Wright, 2006).

This debate notwithstanding, experimentation with environmental markets is now widespread. Ever since the US established the first large-scale environmental market (to regulate emissions of gases that lead to acid rain) in 1995, we have seen environmental markets emerging in everything from wetlands to woodpeckers.

Carbon Markets

The term ‘carbon market’ refers to the buying and selling of emissions permits (rights to pollute) or emissions reductions (offsets) that have been either distributed by a regulatory body or generated by GHG emission reductions projects, respectively. Six GHGs are generally included in ‘carbon’ markets: carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydro fluorocarbons and perfluorocarbons.

GHG emission reductions are traded in the form of **carbon credits**, which represent the reduction of GHGs equal to one metric ton (tonne) of carbon dioxide (tCO₂e), the most common GHG. A group of scientists associated with the Intergovernmental Panel on Climate Change (IPCC) has determined the global warming potential (GWP) of each gas in terms of its equivalent in tonnes of carbon dioxide (tCO₂e) over the course of 100 years. For example, methane has a GWP roughly 23 times higher than CO₂, so one tonne of methane equals about 23 tCO₂e. Likewise, other gases have different equivalences in terms of tCO₂e, with some of them (perfluorocarbons) worth thousands of tonnes of CO₂e.

GHG emissions reduction credits can be accrued through two different types of transactions. In project-based transactions, emissions credits are the result of a specific carbon offset project. Allowance-based transactions involve the trading of issued allowances created and allocated by regulators under a cap-and-trade regime. In cap-and-trade, the regulatory authority caps the quantity of emissions that participants are permitted to emit and issues a number of tradable allowance units equal to the cap. Participants who reduce their emissions internally beyond required levels can sell unused allowances to other participants at whatever price the market will bear.

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Carbon markets can be separated into two major categories: the compliance (or regulatory) and voluntary markets. Because the voluntary market inherently does not operate under a universal cap, all carbon credits purchased in the voluntary market are project-based transactions (with the exception of the Chicago Climate Exchange).

BOX 1.2 The Chicago Climate Exchange (CCX)

Richard Sandor, a former chief economist at the Chicago Board of Trade, launched 'North America's only voluntary, legally binding rules-based greenhouse gas emission reduction and trading system' in 2003 (www.chicagoclimatex.com). He called the trading platform the Chicago Climate Exchange (CCX).

The Exchange refers to the carbon credits it trades as carbon financial instruments (CFIs, also measured in tCO₂e) and restricts trading to members who have voluntarily signed up to its mandatory reductions policy. During the pilot phase (2003–2006) members agreed to reduce greenhouse gas emissions 1 per cent a year from a baseline determined by their average emissions during 1998 to 2001 (see www.chicagoclimatex.com). The current goal (Phase II) is for members to reduce their total emissions by 6 per cent below the baseline by 2010. Hence, members who have been participating since the launch of the trading program only need to reduce an additional 2 per cent, while new members need to reduce 6 per cent during this time (Hamilton, 2006).

Like the carbon market in general, CCX trades six different types of GHGs denominated in terms of tCO₂e. Unlike most of the voluntary carbon markets, the majority of trading on CCX is allowance based, rather than project based. In other words, CCX operates as a cap-and-trade system in which members agree to cap emissions at a stated level and then trade allowances with other participants if they are either under or over their target. While CCX allows members to purchase offsets as a means of meeting emissions targets, offsets registered on the Exchange have accounted for just 10% of total verified emissions reductions (http://www.chicagoclimatex.com/docs/offsets/General_Offsets_faq.pdf).

Therefore, the majority of the credits are allowance-based credits, created by member companies internally reducing their emissions. When and where offset projects are used, CCX requires that an approved third-party organization verify that the project's emissions reductions are real and that they meet standards set by the Exchange.

Since its launch in late 2003, CCX has grown in membership from 19 institutions to over 350 institutions. Ford Motor, International Paper, IBM, American Electric Power, the City of Chicago, the State of New Mexico, the World Resources Institute, and Natural Capitalism Inc. are just a few of its wide range of members from the business, governmental and philanthropic sectors. CCX traded 23 million tCO₂e in 2007 for a total value of US\$72 million (up from 1.45 million tCO₂e in 2005 worth US\$2.7 million). Total market value through the first quarter of 2008 was already at US\$81 million, suggesting the market is still growing quickly year-after-year (Hamilton et al, 2008).

In 2005, CCX created the European Carbon Exchange (ECX), a wholly owned subsidiary which has since become the largest exchange trading carbon credits on the EU Emission Trading Scheme (see below). Since 2006, CCX and ECX have been owned by Climate Exchange Plc, a publicly traded company listed on the AIM of the London Stock Exchange.

Compliance Carbon Markets

There are now a number of regulated cap-and-trade carbon markets around the world. The Kyoto Protocol underpins in one way or another most of these markets. Ratified by 182 countries, the Protocol is a legally binding treaty committing industrialized countries to reduce their collective GHGs by 5.4 per cent below 1990 levels by 2012. The Kyoto Protocol's authors created three major 'flexibility mechanisms' in order to provide the treaty's signatories with a cost-effective means of achieving their greenhouse gas emission reduction targets. These mechanisms are the basis for the regulated international compliance carbon market, and they are:

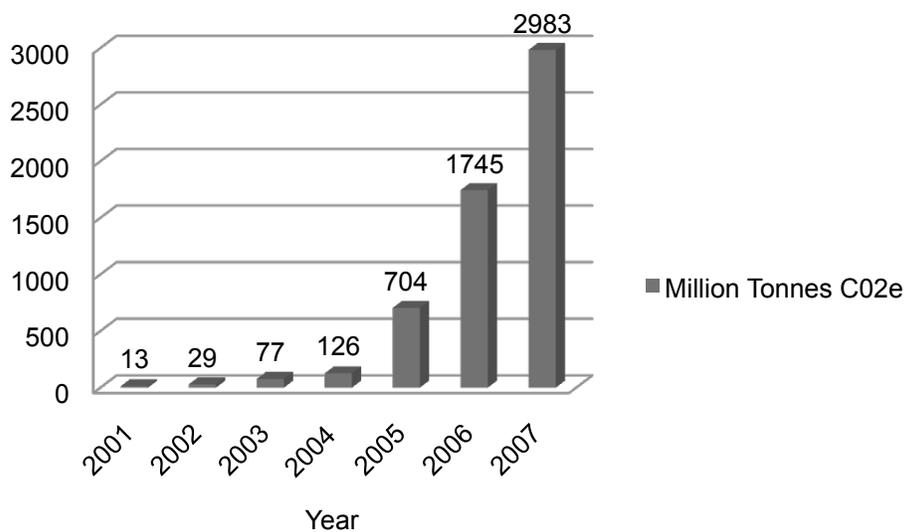
- **Emissions trading:** An allowance-based transaction system that enables countries with emissions targets to purchase carbon credits from one another in order to fulfill their Kyoto commitments.
- **Joint Implementation (JI):** A project-based transaction system that allows developed countries to purchase carbon credits from greenhouse gas reduction projects implemented in another developed country or in a country with an economy in transition (specifically countries of the former Soviet Union). Credits from these JI projects are referred to as Emission Reduction Units (ERUs).
- **Clean Development Mechanism (CDM):** Another project-based transaction system through which industrialized countries can accrue carbon credits by financing carbon reduction projects in developing countries. Carbon offsets originating from registered and approved CDM projects are known as Certified Emissions Reductions (CERs).

The World Bank estimates that in 2007 buyers contracted for 551 million tonnes (Mt) of CO₂e in the primary Clean Development Mechanism (CDM) market of the Kyoto Protocol. Analysts put the total value of the CDM market (primary and secondary) in 2007 at over US\$12 billion. The same year, the Joint Implementation mechanism is believed to have traded only 41 Mt of carbon and have been worth around US\$499 million (Capoor and Ambrosi, 2008).

To meet their Kyoto obligations, countries have established (or are establishing) national or regional emissions trading schemes to help them meet their Kyoto targets. For instance, in January 2005, the European Union launched the first phase of the EU Emission Trading Scheme (EU ETS) to help achieve its greenhouse gas emission reductions targets required by the Kyoto Protocol. The EU ETS involves all of the EU's member states and allows limited trading with the three Kyoto mechanisms described above through a linking directive. More specifically, EU members may trade allowances (known as EU emissions allowances, or EUAs) with one another, or they may buy and sell carbon credits— ERUs and CERs— generated by Joint Implementation (JI) or Clean Development Mechanism (CDM) projects.

By the end of its first year of trading, the EU ETS had transacted an estimated 362 million tonnes (Mt) of carbon credits, worth approximately €7.2 billion (or US\$9 billion) (Point Carbon, 2006; Capoor and Ambrosi, 2006). By 2007, the EU ETS had traded over 30 billion tonnes of carbon credits.

Figure 1.2 Growth in Trading Volume, Global Carbon Market



Note: The launch of the European Union's Emission Trading Scheme in 2005 drove huge expansion in the global carbon market in 2005 (Capoor and Ambrosi, 2008; Capoor and Ambrosi, 2006; Lecocq and Capoor, 2005).

Outside of Europe, regulated emissions trading schemes related to the Kyoto Protocol have not developed as quickly. Japan and Canada ratified the treaty, and Japanese companies, in particular, have been active buyers of carbon credits on the CDM market, but neither country has launched a regulated emissions trading scheme of its own. The Japanese government has a government-mediated voluntary market for carbon and is in the process of setting up a national scheme, as is New Zealand, while the Canadian government has indicated that the country is not likely to meet its Kyoto targets and has talked of scrapping plans for a national emissions trading scheme. At the same time, several Canadian provinces have opted into the Western Climate Initiative, a voluntary trading program with western US states set to begin trading in 2010.

The explosive growth of the global compliance carbon market under the Kyoto Protocol has meant that prices for carbon credits have been extremely volatile, with carbon trading anywhere from €7 to €32 a tonne (Point Carbon). Despite this volatility, carbon markets around the world have matured, and in 2008, the global carbon market was valued at a whopping US\$64 billion (€47 billion),

As regulators and participants refine their approaches to allocating and trading carbon credits, new investment vehicles and emissions reduction strategies are emerging. The World Bank estimated that the total capitalization of carbon investment vehicles could top US\$13 billion in 2008 (Capoor and Ambrosi, 2008).

A short section from the World Bank's *State and Trends of the Carbon Market 2008* report suggests the level of sophistication to which the compliance carbon market has evolved and matured:

Financial institutions have entered the carbon world acquiring pioneering carbon aggregators and building a base for origination of carbon assets globally. An increasing number of carbon contracts and carbon-based derivatives are becoming available. Specialized companies and institutions have sprung up to service several aspects of the carbon value chain; some have begun to pair carbon finance with more traditional skills found in other commodity markets.

Several dedicated funds focusing on developing and participating in greenfield projects have been launched (i.e., these funds are either partially replenished with carbon revenue streams or account with the sale of the credits to meet investor expectations of return). Large international banks have established structured origination teams to pick up principal positions in carbon-rich projects and have set up carbon trading desks, seeking arbitrage opportunities. Financial institutions offer products that reduce or transfer risk, for instance by offering delivery guarantees for carbon assets in the secondary market.

Echoing the World Bank's analyses over the years, Annie Petsonk, international counsel for Environmental Defense's Global and Regional Air Program, says she is particularly pleased with some of the innovations triggered by the CDM. Petsonk says people, inspired by the active market in Europe, are now pouring money into new clean technologies in the hopes of capitalizing on a perceived first-mover advantage. Indeed, the European experience with carbon trading suggests that large-scale environmental markets are not only feasible, but also are capable of changing the way businesses relate to environmental issues (Kenny, 2006). Challenges remain, however, and the first half of 2008 has seen a growing spread between EU allowances and CERs from the CDM, driven largely by uncertainty over the future of the CDM market in a post-2012 international climate change agreement (Capoor and Ambrosi 2008).

Movement in the US

The United States did not ratify the Kyoto Protocol, and the federal government does not currently regulate carbon dioxide (CO₂) or any other GHGs regulated under Kyoto as climate change-related pollutants. Having ratified the Montreal Protocol, the US does regulate ozone depleting GHGs, such as Chlorofluorocarbons (CFCs), which are being phased out entirely on the international scale.

As of March 2008, legislators in the 110th US Congress introduced more than 195 bills, resolutions, and amendments addressing climate change.

To compensate for the lack of national CO₂ regulation, several states have initiated their own regulations alone or in conjunction with others. Legislation is quickly evolving at the national and multi-state levels as more states step up to the plate on climate legislation and members of Congress announce new legislative proposals on a monthly basis. As of March 2008, legislators in the 110th US

Congress introduced more than 195 bills, resolutions, and amendments addressing climate change (Pew Center on Global Climate Change, 2008). Currently, GHG emissions markets exist or may soon exist under a handful of regimes, profiled below.

In 1997, Oregon enacted the Oregon Standard, the first regulation of CO₂ in the United States. The Oregon Standard requires that new power plants built in Oregon reduce their CO₂ emissions to a level 17% below those of the most efficient combined cycle plant, either through direct reduction or offsets. Plants may propose specific offset projects or pay mitigation funds to The Climate Trust, a

non-profit created by law to implement projects that avoid, sequester, or displace CO₂ emissions (The Climate Trust, 2008).

On the East Coast, ten states (Connecticut, Delaware, Maryland, Massachusetts, Maine, New Hampshire, New Jersey, New York, Rhode Island, and Vermont) have developed the Regional Greenhouse Gas Initiative (RGGI), a regional strategy to reduce CO₂ emissions utilizing a cap-and-trade system. Although RGGI will not officially launch until January 2009, the first auction of emission permits is set for September 2008 and brokers report that forward transactions are already taking place on this market. Member states anticipate auctioning close to 100% of their annually allocated allowances, which represent approximately 171 MtCO₂e per year. The emissions cap will initially apply to power plants in member states that use fossil fuels to generate over half their electricity and have energy production capacities above 25 MW. The cap's applicability is much broader for power plants that commenced operations after 2004, and includes power plants with fossil fuels constituting over 5% of their annual total heat input (RGGI, 2007). The program may be extended to include other GHGs, as well as offsets from projects and project-based transactions. Member states have agreed to allocate the revenues of at least 25% of allowances to consumer benefit programs. States maintain autonomy over allocating the remaining 75% of allowances (RGGI, 2007).

RGGI has a sliding scale that permits the use of flexible mechanism credits based on market prices: the lower the price of emissions reduction credits, the more restrictive the use of those credits. If the average price of credits across the United States remains under \$7/short tCO₂e (as opposed to a metric tonne), the scheme only allows participants to cover up to 3.3% of their emissions using credits from emissions reduction projects, which must be located within the United States. If the average price in the US goes above \$7/short tCO₂e, offsets can be used for up to 5% of emissions, and if prices rise above \$10/ short tCO₂e, participants can use offsets for 10% of their emissions. Under this last scenario, offsets may be used from US-based projects as well as from the EU ETS and the Kyoto Protocol's CDM (RGGI, 2007).

California's Global Warming Solutions Act (AB 32) is the first US state-wide program to cap all GHG emissions from major industries and to include penalties for non-compliance. Under the Act, California's State Air Resources Board (CARB) is required to create, monitor, and enforce a GHG emissions reporting and reduction program. The California Market Advisory Committee (MAC) was created in December 2006 to provide recommendations on the implementation of the Act. In the implementation of AB 32, Governor Schwarzenegger authorized CARB to establish market-based compliance mechanisms to achieve reduction goals. The MAC's current recommendations include: the eventual incorporation of all GHG-emitting sectors of the economy into the cap-and-trade system; a first-seller approach whereby responsibility is assigned to the utility that initially sells electricity into the state; an allocation design that combines free and auctioned pollution permits, with the amount being auctioned increasing over time, and the promotion of linkages with other emerging cap-and-trade systems (CalEPA, 2007).

The Western Climate Initiative (WCI) includes California and five other states (New Mexico, Oregon, Washington, Arizona, and Utah) as well as three Canadian provinces (British Columbia, Manitoba, and Quebec). It was formed in February 2007, and member states have committed to a 15% GHG emissions reduction goal below a 2005 baseline by 2020. In mid-2008, the WCI released its Draft Design Recommendations and Draft Essential Requirements for Reporting, and plans to launch a

cap-and-trade program in 2012. WCI intends to begin mandatory measuring and monitoring of emissions in 2010 for all regulated entities, and reporting of emissions in early 2011.

A third regional cap-and-trade program is also in the making: the Midwestern Regional GHG Reduction Program (MRP). This program consists of the following members: Iowa, Illinois, Kansas, Minnesota, Wisconsin, Michigan, and Manitoba (Canada). The Midwestern Greenhouse Gas Accord was signed in November 2007, and aims to incorporate an approximate emissions target of 16% below 2005 levels. The program is scheduled to start in 2012 and will incorporate a regional cap-and-trade system covering most sectors of the economy. The scheme aims to cover approximately 1,107MtCO₂e per year by 2012 and is slightly larger than the WCI (Hamilton et al, 2008).

Australia's Pioneers

While Europe's compliance carbon market clearly leads the world in terms of sophistication and scale, it is worth noting that the state of New South Wales (NSW) in Australia launched the NSW Greenhouse Gas Abatement Scheme on January 1, 2003, two years before the first trade ever took place on the EU ETS.

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The New South Wales (NSW) Greenhouse Gas Abatement Scheme (GGAS) is a mandatory, state-level cap-and-trade program designed to reduce greenhouse gas emissions associated with the production and use of electricity, and to develop and encourage activities to offset the production of greenhouse gases. Legislators set the target at 8.65 tonnes of carbon dioxide equivalent per capita in 2003, decreasing by about 3 per cent each year through 2007, when it became and will remain at 7.27 tonnes (<http://www.greenhousegas.nsw.gov.au>). It requires individual electricity retailers and certain other parties who buy or sell electricity in NSW to meet mandatory benchmarks based on the size of their shares of the electricity market.

If a regulated emitter exceeds its target, it has the choice of either paying a penalty of AU \$11.50 (about US\$9) per tCO₂e or purchasing New South Wales Greenhouse Abatement Certificates (NGACs), which are generated by emissions abatement projects carried out within the state. NGACs can be generated by approved providers with projects that lead to low emissions electricity generation, improved energy efficiency, biological CO₂ sequestration, or reduced onsite emissions not directly related to electricity consumption. The initiative does not accept credits, such as CERs or ERUs, from outside of the state. The NSW GGAS traded some 25 million certificates in 2007 for a total market value of US\$224 (€164 million) (Hamilton et al, 2008).

According to the World Bank, outside of the Kyoto markets, the NSW GGAS is the world's largest, regulated cap-and-trade GHG market, with about 25.41MtCO₂e traded in 2007 and an estimated

value of US\$224.10 million (Capoor and Ambrosi, 2008). After years of holding out, Australia ratified the Kyoto Protocol in 2007, soon after the inauguration of new Prime Minister Kevin Rudd. According to the current government, a national emissions trading scheme will be launched in Australia no later than 2010 (Capoor and Ambrosi, 2008).

Unfortunately, the emission reductions driven by current state and regional schemes in Australia and the US are tiny compared to those mandated by the Kyoto Protocol, and the emission reductions driven by the Kyoto Protocol are tiny compared to those scientists deem necessary. Throw in other non-market-based reduction strategies around the world and Mark Kenber, head of policy strategy at The Climate Group in London, says, 'The policies that we see around the world are nowhere near what the science suggests we need.'

Thin End of the Wedge

Guy Brasseur, head of the Hamburg-based Max Planck Institute for Meteorology, echoed Kenber's comments when he told the European Parliament in November of 2005, 'Kyoto won't be enough.'

'Emissions,' said Brasseur, 'will need to fall by 80 or 90 per cent, rather than five or 10 per cent, to have an effect on the models. In terms of a response, Kyoto is only a start' (Kenny, 2006).

In the absence of a much larger global effort to reduce greenhouse gas emissions, models suggest the amount of carbon dioxide trapped in the atmosphere will double within the next 50 years and quadruple by the turn of the century. According to Professor Steve Pacala, head of Princeton University's Carbon Mitigation Initiative, that would 'bring out the monsters behind the door' – melting the Greenland ice cap, washing away coastal cities, spreading famine, and intermixing hurricanes with prolonged droughts (Kenny, 2006).

Models suggest the amount of carbon dioxide trapped in the atmosphere will double within the next 50 years.

While scientists cannot say how many gigatonnes of carbon dioxide emitted into the atmosphere will produce how many degrees of warming, they do agree that roughly seven billion tons – seven gigatonnes – of carbon dioxide emissions must be prevented from entering the atmosphere during the next 50 years in order to stabilize the concentration of carbon dioxide in the atmosphere at 500ppm. Pacala slices a metaphorical emissions pie into seven wedges in order to demonstrate how the world might achieve a seven-gigatonne cut (Pacala and Socolow, 2004). With each wedge representing one gigatonne of carbon dioxide emissions, Western Europe's emissions comprise about one seventh of the pie. In other words, if the ETS meets its current targets and then extends them for the next four decades, it would remove only one wedge of the pie (Kenny, 2006).

The current carbon market, it seems, represents only the very thin end of the wedge when it comes to combating climate change. Fortunately, however, wedges sometimes work like levers. Recognizing the need for increased action, some institutions and individuals have undertaken voluntary commitments to minimize (or even neutralize) their contribution to climate change by offsetting their emissions through investments in projects that either remove an equivalent amount of carbon dioxide from the atmosphere, or prevent it from being emitted in the first place. Hundreds of companies – ranging from Google to General Electric – have now incorporated the idea of carbon

offsetting into corporate sustainability plans, spawning voluntary markets worth an estimated \$331 million in 2007 (Hamilton et al, 2008).

Much like the credits traded in a regulated cap-and-trade scheme, voluntary offset projects generate credits equal to the removal or avoided emission of one tonne of carbon dioxide. Institutions voluntarily purchasing credits either have set caps on themselves, such as a 10 per cent reduction below 1990 levels, or have decided to offset some or all of the emissions related to their activities. Institutions claiming to have offset their greenhouse gas emissions must retire credits purchased. As in a compliance market, carbon credits in a voluntary market ideally allow actors to reduce emissions at least cost.

Voluntary Carbon Markets

Voluntary carbon markets are nothing new; in fact, they pre-date all regulated carbon markets. The world's first carbon offset deal was brokered in 1989 (long before the Kyoto Protocol was signed, let alone ratified), when AES Corp., an American electricity company, invested in an agro-forestry project in Guatemala (Hawn, 2005).

Since trees use and store carbon as they grow (an example of carbon sequestration), AES reasoned it could offset the GHGs it emitted during electricity production by paying farmers in Guatemala to plant 50 million pine and eucalyptus trees on their land (Hawn, 2005). AES, like other companies since, hoped to reduce its 'carbon footprint' for philanthropic and marketing reasons, not because it was forced to do so by legislation or global treaty. The deal thus was voluntary, marking the beginning of a voluntary carbon market that remains as controversial and interesting today as it was in 1989.

Unlike the regulated markets, the voluntary markets do not rely on legally mandated reductions to generate demand. As a result, they sometimes suffer from fragmentation and a lack of widely available impartial information. The fragmented and opaque nature of the voluntary markets can, in large part, be attributed to the fact that they are composed of deals that are negotiated on a case-by-case basis, and that many of these deals neither require the carbon credits to undergo a uniform certification or verification process nor register them with any central body. As a result, there are as many types of carbon transactions on the voluntary markets as there are buyers and sellers; a variety of businesses and non-profits based on different models sell a range of products, certified to a wide array of standards.

The lack of uniformity, transparency and registration in the voluntary markets has won them a great deal of criticism from some environmentalists who claim that they are a game of smoke and mirrors rather than an engine of actual environmental progress. Many buyers also say they are wary of the voluntary carbon markets because transactions often carry real risks of non-delivery. Some companies buying carbon credits also fear that they will be criticized by non-governmental organizations (NGOs) if the carbon they are buying isn't seen to meet the highest possible standards.

Of concern to environmentalists and buyers, alike, is the fact that the voluntary carbon markets' lack of regulation may mean they cannot reach the scale necessary to impact the problem.

Of concern to environmentalists and buyers, alike, is the fact that the voluntary carbon markets' lack of regulation may mean they cannot reach the scale necessary to impact the problem. Because they lack a regulatory driver, demand for credits can be fickle. The sudden explosion of the Kyoto-driven carbon markets in 2005 shows the difference that regulation can make. Clearly, regulation is key to driving large-scale demand. 'The voluntary credit market could grow by an order of magnitude or two orders of magnitude and it's still not going to impact the problem,' explains Mark Trexler, Director of EcoSecurities Global Consulting Services (Trexler, 2006).

Despite the shortcomings of the voluntary markets, many feel they are fast-evolving arenas with some distinct and important advantages over the regulated carbon markets. For example, while the wide range of products emerging from the voluntary markets can be confusing to potential buyers, these products can also be highly innovative and flexible. Numerous suppliers say they benefit from this flexibility and the lower transaction costs associated with it.

For example, getting a carbon offset project approved by the CDM Executive Board under the Kyoto Protocol costs up to US\$350,000 (Kollmuss et al, 2008). By the time the United Nations CDM Executive Board finally registers a typical small-scale CDM project (essentially creating the CER that can be sold on the CDM markets), the United Nations Development Programme (UNDP) calculates that the project's total up-front costs will account for 14–22 per cent of the net present value of its revenue from carbon credits (Krolík, 2006). For many projects, coming up with the start-up capital to register a project for the compliance carbon market is prohibitively difficult. The voluntary carbon markets, on the other hand, don't have these sorts of transaction costs. They can avoid 'bottlenecks' in the CDM methodology approval process and obtain carbon financing for methodologies that aren't currently 'approved' by the CDM Executive Board. For example, the Nature Conservancy is working towards obtaining carbon financing for forest protection projects (which in Kyoto parlance is referred to as 'avoided deforestation'), a concept not currently approved to produce carbon credits under the CDM process.

The innovation, flexibility and lower transaction costs of the voluntary carbon markets can benefit buyers as well as suppliers.

The innovation, flexibility and lower transaction costs of the voluntary carbon markets can benefit buyers as well as suppliers. When an organization purchases carbon offsets to meet a public relations or branding need, creativity, speed, cost-effectiveness and the ability to support specific types of projects (e.g. those that also benefit local communities or biodiversity) can often be clear and valuable benefits.

Having weighed such pros and cons, many non-profit organizations are supportive of the voluntary carbon markets because they provide individuals—not just corporations and large organizations—with a means of participating in the fight against climate change in a way that the compliance markets do

not. In particular, some environmentalists view the voluntary carbon markets as an important tool for educating the public about climate change and their potential role in addressing the problem. Some sellers and buyers of carbon credits prefer the voluntary carbon markets precisely because they do not depend on regulation.

In 2007, a range of articles in the mainstream press highlighted various issues related to offset quality in the voluntary carbon markets. In response, suppliers embraced a range of tools for

producing high quality credits and proving their legitimacy, notably standards and registries, which are discussed in more detail in Chapter 2. As the international political community struggles to implement an effective climate change framework, these infrastructural developments, coupled with the tremendous growth in the voluntary carbon market over the last several years, indicate that the voluntary carbon markets collectively have the potential to become an active driver of change today—not ten years from now.

A More Formal Affair

Be they fans or critics, experts agree that the voluntary carbon markets are in a critical period. Spurred by the success of the regulated carbon markets, the voluntary markets are formalizing, as investors who cut their teeth on the regulated markets look for other places to put their money, and as buyers and sellers consolidate around a few guiding practices and business models from which conclusions can be drawn about market direction and opportunities.

Although nobody has exact numbers on the size of the global voluntary carbon markets, most think they have grown rapidly in the last two years. In their *State of the Voluntary Carbon Markets 2008* report, Ecosystem Marketplace and New Carbon Finance were able to track the transaction volumes presented in Table 1.1 (below), though the actual number of transactions is certain to be significantly greater.

Table 1.1
Voluntary Carbon
Markets Size

Year	Voluntary Markets' Volume (millions tonnes/yr)
Pre-2002	38
2002	10
2003	5
2004	11
2005	11
2006	25
2007	65
2008 (est.)	148

Source: Ecosystem Marketplace/New Carbon Finance, 2008

While maturing quickly, the voluntary markets remain small, transacting roughly 2% of the volume of the Kyoto markets. Despite the comparatively small scale of the voluntary carbon markets, some investors believe they are poised for explosive growth, and many companies see real business opportunities associated with the creation of carbon-neutral products for retail consumption. If these predictions are to be borne out, most market players think it will be necessary to formalize and streamline the voluntary markets, making them more accessible and gaining the confidence of large institutional buyers in Australia, Europe, Asia and North America.

At present there are several related and unrelated efforts underway to make the voluntary carbon markets more 'investor-friendly' by creating registries, documenting the size of the markets, and standardizing the credits being sold. In the past several years, the standards and registry infrastructure has matured rapidly. For instance, the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI) jointly issued the Greenhouse Gas Protocol for

Project Accounting (WBCSD/WRI GHG Protocol) in December 2005. In March of 2006, the International Organisation for Standardisation (ISO) followed up with the ISO 14064 standards for greenhouse gas accounting and verification. Several other standards have become major sources of certification in the last couple of years, including VER+, the Voluntary Carbon Standard, and the Gold Standard (see Table 1.2).

Table 1.2 Standards in the Voluntary Carbon Markets

Standard	Description	Env. & Social Benefits	Reporting/Registration	Includes LULUCF Method'y?	Geographical Reach	Start Date	Projects/Credits Verified
Gold Standard for VERs	Certification for offset projects & carbon credits	Yes	VER registry in development	RE & EE projects	International	1 st validated 2006, 1 st verified 2007	10 VER projects verified
The VCS	Certification for offset projects & carbon credits	No	Use Bank of New York; other registry TBD	Yes, Methodologies TBD	International	Expected mid-2007	Unknown
Green-e Climate	Certification program for offset sellers	No	Registry Incorporated	Accepts other standards with LULUCF	Aimed at N.A., International possibilities	Expected mid-2007	3 companies
CCB Standards	Certification program for offset projects	Yes	Projects on Website	Only LULUCF	International	1 st project certified in 2007	9 projects
CCX	Internal system for CCX offset projects & CCX carbon credits	No	Registry Incorporated w/ trading platform	Yes	International	2003	28Mt CFI's registered.
Plan Vivo	Guidelines for offset projects	Yes	No	Community based agro forestry	International	2000	3 projects
Greenhouse Friendly	Certification program for offset sellers & carbon neutral products	No	No	Yes	Australia	2001	4,373,877 registered (259,202 in 2007)
CCAR	A Registry Protocol	No	Reporting protocols used as standards	Yes, first protocol	Forestry-California; Livestock- US	1 st protocol in 2005	2 projects
VER+	Certification program for offset projects carbon neutral products	No	TÜV SÜV Blue Registry	Includes a JI or CDM meth's	International	Expected launch mid-2007	706,107 VERs registered
ISO 14064	Certification program for emissions reporting offset projects, carbon credits	No	No	Yes	International	Methodology Released in 2006	Unknown
VOS	Certification for offset projects & carbon credits	No	TBD	Follow CDM or JI meth's	International	TBD	Unknown
Social Carbon	Certification for offset projects & carbon credits	Yes	Creating its own registry system	Reforestation & Avoided deforestation	South America & Portugal	1 st Methodology applied in 2002	10 projects representing 350,000 tonnes
DEFRA	Proposed consumer code for offsetting & accounting	No	Does not include a registry	If CDM/ JI approved	UK	TBD	Unknown

Source: Hamilton et al, Forging a Frontier State of the Voluntary Carbon Markets 2008

Building on the establishment of standards, a new feature of the voluntary carbon market infrastructure is sprouting up across the globe: carbon credit registries. These registries are designed to track credit transactions and ownership as well as reduce the risk that a single credit can be sold to more than one buyer. When dealing with a commodity as intangible as a carbon credit, such registries are crucial, but they have not been prevalent in the voluntary markets until recently. Several new registries were launched during the first four months of 2008 alone, including the New Zealand-based registry and exchange TZ1, the California Climate Action Registry's Climate Action Reserve, and The Gold Standard's Registry for VERs (the latter two set up by market infrastructure provider APX).

Whatever one's take on the long term prospects of the voluntary carbon markets, it seems clear that in the short term, the markets are evolving quickly, creating new economic and environmental opportunities for investors, businesses, non-profits and individuals. It is therefore important to understand how these markets operate. In the next chapter, then, we will turn our attention to addressing a basic but all-important question: how do the voluntary carbon markets really work?

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This version of Chapter 1 has been slightly modified from the version appearing in the upcoming second edition of the book Voluntary Carbon Markets: An International Guide to What They are and How They Work (scheduled for publication in winter 2008).

Seeing the Forests for the Trees: Land Use Change in the Carbon Markets

Speaking for the Trees: Voluntary Markets Help Expand the Reach of Climate Efforts

by David Biello

Alongside the burgeoning compliance market in carbon reductions spawned by ratification of the Kyoto Protocol, the voluntary market—made up of everyone from large corporations to interested individuals—continues to grow as efforts to combat climate change become increasingly well known. The Ecosystem Marketplace tracks the profusion of programs and companies reducing greenhouse gas emissions and selling carbon dioxide offsets on the voluntary market.

In 1997, a small company began planting single trees for individual consumers to help combat climate change. The offering was small, the science was incomplete, and awareness was limited. Nevertheless, the company had a vision for the future, a future filled with new forests offsetting the greenhouse gas (GHG) emissions of individuals and corporations around the world.

Planting the trees would not be that expensive and it would offer a cost-effective opportunity to reduce emissions deemed absolutely necessary to life in the 21st century.

The trees—by consuming carbon dioxide (CO₂) during photosynthesis and their growing cycle—would counterbalance the daily CO₂ that came from driving to work, burning coal to produce power, or flying to meetings. Planting the trees would not be that expensive and it would offer a cost-effective opportunity to reduce emissions deemed absolutely necessary to life in the 21st century.

With a clear nod to the future they envisioned, the company called itself, simply, Future Forests. On 14 September 2005, Future Forests changed its name to The CarbonNeutral Company.

In many respects, the company's evolution—from its launch as Future Forests in 1997 to its new name change to CarbonNeutral—parallels that of the voluntary carbon market since the turn of the century.

"For the last three to four years, we've been offering an end-to-end carbon management service," says Jonathan Shopley, CEO. "As we've grown in that sector we've found that our name has become something of a misnomer."

The Voluntary Market

Many things have changed since Future Forests got its start. The Kyoto Protocol came into effect in February of this year after Russia ratified it. With it came fledgling markets for offsets under the terms of the Clean Development Mechanism (CDM) and Joint-Implementation (JI) protocol. And the European Union developed and implemented a nearly continent-wide cap-and-trade program for CO₂. A true--and active--compliance market was born, where allowances in the EU Emissions Trading Scheme (EU ETS) cost as much as EU\$29 per metric ton.

But there are few trees in sight. The multilateral overseers of the CDM and JI have not yet seen fit to approve any of the methodologies explaining how new trees absorb CO₂ and keep it out of the atmosphere. And the EU ETS seemingly rejects the idea of forestry projects, preferring to focus on reductions from industry and electricity production.

With such compliance markets quickly ramping up, voluntary efforts--like Future Forests--might have taken a back seat. Instead, the voluntary market has broadened the reach of mandatory efforts. In fact, according to a study from the Hamburg Institute of International Economics, the voluntary market alone accounted for 9 million metric tons of CO₂-equivalent in 2004—offsets that would not have happened otherwise. "If these offsets are truly additional, then the voluntary market is additional to the regulatory market," says John Niles, manager of the Climate Community and Biodiversity Alliance (CCBA), a standard-setting coalition of corporations and environmental groups. "If they are additional, then it should be encouraged. It's more carbon staying out of the atmosphere."

While the CarbonNeutral Company says it no longer focuses on planting single trees for crusading citizens, it has expanded its business by helping corporations assess their emissions and make their own reductions through project portfolios that may or may not include offsets (from tree-planting or otherwise). The company also helps corporations wield their newfound carbon neutrality to best effect in marketing, sales, and public relations.

"The Internet is becoming one of our biggest clients."

"If you're out there offering offsets as a sole solution, there is a temptation to suggest that people are buying offsets as a means of avoiding deep, hard decisions about their operations," says Shopley. "We've never seen offsets as an alternative to [other changes], but rather [we see them] as an integral part of a carbon neutral program."

European Climate

Many European consumers understand climate change. From wind farms in Denmark to car taxes based on carbon emissions in the UK, national efforts are in place that put climate change in the public spotlight again and again. European consumers also want to do something about it in their own lives. "The CDM continues to be for countries and large corporations to get involved in. It's not

accessible to the individual consumer,” explains Tom Morton, director of Oxford-based offset provider Climate Care. “People like the idea of offsetting their emissions and so they come to people like us to do that.”

And the number of people doing that seems to be growing by leaps and bounds. “We’ve seen a sevenfold increase in our Internet sales this year,” Morton says, noting that his company has already sold roughly 100,000 metric tons of CO₂ this year—double last year’s total already.

Spurred on by this growing awareness, more and more Europeans are offsetting the emissions from their air travel—a major source of GHG emissions that go directly into a sensitive portion of the atmosphere—through programs like Dutch-based Business for Climate’s COOL Flying or Switzerland-based myclimate tickets.

And, where consumers lead, it is hard for companies not to follow. Recent innovative efforts range from credit cards that allow you to earn carbon offsets rather than air miles, to gasoline whose carbon emissions have been offset, to climate neutral fruit drinks. “They offset the emissions of the transport of the exotic fruit to Switzerland and the making of the plastic bottle,” explains Corinne Moser, a founding member of Zurich-based offset provider myclimate.

With this much consumer and corporate interest, Europe has a multitude of companies looking to provide offsets in a variety of ways and at various prices. “The three factors in price are: offset class, the overall volume, and where [in the world] you go to purchase,” says Ingo Puhl, managing director at German offset provider and carbon consultant 500ppm.

Trees vs. Tech

In the early days, trees were the most popular offset class. “One reason people want forests is because it is tangible,” explains Denis Sliker, director of Netherlands-based offset provider Business for Climate. “It also has an emotional aspect. It not only helps the climate, it’s also nature, a home for animals and community development.”

Most people want to see that their own relatively small purchase has made some difference.

But as the offset market has grown, so has criticism of efforts simply to plant trees or avoid cutting down existing forests. Environmental groups and others have said that such projects do little to reduce overall pollution, are scientifically unreliable (an argument seemingly born out by recent studies), and lack the necessary permanence. Even

though much of the language of the Kyoto Protocol and other market-based efforts covered exactly how such forestry projects could be done, these concerns—plus the complexity they engendered—effectively eliminated forestry from mandatory markets.

But in the voluntary market, such forests could flourish, thanks to the intuitive appeal of trees and the host of other benefits they bring with them. “Most people want to see that they’re own relatively small purchase has made some difference,” says Richard Tipper, director of the Edinburgh Centre for Carbon Management (ECCM) and its Plan Vivo system. “We’ve identified that as consumer additionality.”

Under the terms of Plan Vivo system, small farmers in Mexico, Mozambique and Uganda are able to get extra money from ECCM and its buyers in exchange for planting trees on part of their land or not clearing forest stands that are already there. “The idea was to see if we could use the carbon market to develop a long-term income stream that would be contingent on actual progress but would also give farmers the ability to plan exactly what they wanted,” Tipper explains.

While the cost was higher—\$13 per ton of carbon—the technical specificity and long-term monitoring of Plan Vivo as well as its community development benefits—\$8 out of the \$13 price goes directly to farmers—made it an attractive option, despite the apparent drawbacks of forestry. As a result, since 1997, ECCM has sold 250,000 metric tons of CO₂ reductions from its project in Chiapas, Mexico.

“I would hope that things like the Plan Vivo system provide a framework for dialogue between buyers and sellers. What type of legal agreement do you want with the farmers? Do you want something that you can legally enforce?” Tipper says. “Our buyers said ‘No. We just want to make sure that our money is being put to good use.’”

Global Expansion

Trees are also popular in other parts of the world, outside the direct realm of the Kyoto Protocol and Europe’s mandatory market. Australia, which explicitly repudiated Kyoto in 2002, has Greenfleet, a nonprofit offset program. For AU\$40, a buyer offsets car travel CO₂ emissions for one year (based on estimates of 4.3 metric tons for an “average” vehicle) through the planting (and growing) of “17 trees.”

“We have planted over 2 million trees in excess of 250 sites up and down the seaboard of Australia”
— Sara Gipton

“We have planted over 2 million trees in excess of 250 sites up and down the seaboard of eastern Australia,” says Sara Gipton, Greenfleet’s business manager. “Trees are planted on land made available by the owner under a ‘carbon agreement’ which ensures the security of the trees as long as that landholder holds that land.”

It’s an effort to cut back on Australia’s transportation emissions—not unlike BP’s climate friendly fuels—as well as an effort to restore cleared land and prevent further degradation of the soil. And it’s not only nonprofits like Greenfleet getting in on the act.

Sydney-based New Forests Pty Limited—an independent offshoot of the Hancock Natural Resources Group—plans to help institutional investors derive new income from their forestry holdings through carbon. “They can outperform by selling carbon credits or undertaking the leasing of lands,” says David Brand, managing director of the new company. “Down the road, we’ll offer new forest ecological projects, not just carbon but biodiversity and water benefits.”

And the nation that is the largest emitter of CO₂ in the world seems to have a particular fondness for forests. The US pushed for forestry projects—and market-based mechanisms—to be included in the Kyoto Protocol under the Clinton administration and a host of individual companies and

organizations with US headquarters—like The Nature Conservancy and Conservation International—continue to push forestry projects despite the US withdrawal from Kyoto in 2001.

For example, PowerTree (and its predecessor UtiliTree) is a joint effort of several US power companies—among the largest sources of CO₂ in the world—to plant trees in the lower Mississippi valley. “There was a loss of millions of acres of bottomland hardwood forests down there since the mid-20th century,” explains John Kinsman, director of air quality programs at power industry group the Edison Electric Institute (EEI).

Twenty-five power companies banded together, pooled \$3 million, and planted more than 3,600 acres worth of trees to provide new animal habitat and carbon offsets. “We’re picking ecologically significant locations,” Kinsman says. “We expect there will be some carbon credits to come out of this.”

How many exactly depends on future regulation and the hardiness of the trees. But it is a model that many US electric utilities endorse. “PowerTree is a very good model from the standpoint of offering a way off-system to reduce CO₂. Plus, it helps the science of CO₂ uptake,” says Melissa McHenry, a spokeswoman for the largest CO₂ emitter in the US, American Electric Power (AEP). “We’ve invested about \$25 million in terrestrial sequestration.”

And, while individual consumers in the US have been slow to catch on to offset possibilities, forestry projects can be attractive to providers for the same reasons as anywhere else in the globe. “There’s a strong need for reforestation of degraded areas,” says Erica Graetz, program and operations manager for The Climate Trust, an Oregon-based fund that provides offsets to the power sector and individuals. “There’s a lot of co-benefits to using carbon money to fund reforestation as far as air, biodiversity and water quality goes.”

“But there’s a lot of risk associated with it,” she continues.

Impermanence

That risk comes from all the threats to a natural forest: fire, insects, logging. But it also comes from the nature of the projects themselves. Trees only absorb carbon slowly over the course of decades and they do nothing to address the root of the climate change problem: the burning of fossil fuels.

Trees only absorb carbon slowly over the course of decades and they do nothing to address the root of the climate change problem: the burning of fossil fuels.

As a result, offset providers in Europe are moving away from such projects. “Planting trees, to us, is quite a dangerous thing. You cannot guarantee that the trees will still be there in 40 years if there’s a forest fire or a logging,” myclimate’s Moser says. “We focus on [energy efficiency and renewable energy] projects because we need to contribute to a sustainable energy future.”

That means that even companies that once had forest in their name, like The CarbonNeutral Company, are moving away from such projects. “Last year, the split between forestry and technology-based projects was about 50-50,” says Bill Sneyd, operations director for the Company.

“We reckon that within about two years it will be 80% to 20% technology to forestry.”

Part of this is driven by the demands of clients. For example, international bank HSBC recently committed to becoming carbon neutral and is looking to purchase roughly 170,000 metric tons of CO₂ per year. But none of those tons can come from a forestry-related project.

And in the US, the voluntary carbon market is rapidly becoming conflated with the market for renewable energy credits (RECs)—allowances that are created by wind, solar, biomass, and other renewable generation in various states. Two major consumer efforts—TerraPass, a business school project turned business that aims to offset vehicle emissions, and Carbonfund.org, a nonprofit that has partnered with advocacy group and environmental marketer Working Assets to fund offset projects—source almost half of their offsets from RECs.

Plus, several REC providers—such as the Bonneville Environmental Foundation (BEF) or Native Energy—market their product via carbon offsets. “We call them green tags and we consider the green part to be the fact that renewable power generation causes the CO₂ emissions reduction or offset,” says Patrick Nye, BEF’s director of sales. “It’s basically just a way of explaining that buying X amount of green power cuts Y amount of carbon.”

“In order to do RECs you have to put it in terms the customer understands,” says Tom Arnold, chief environmental officer at TerraPass. “So it’s put in terms of [sport-utility vehicles] taken off the road.”

Crediting Consumers

Putting it in terms the customer understands is exactly why trees became popular in the first place. And given forestry’s potential to promote sustainable development in impoverished parts of the world, many—including the head of the World Bank’s carbon finance group, Odin Knudsen—would like to see forestry remain part of the voluntary—and mandatory—markets.

If the credibility of offsets developed for the voluntary market continues to grow, market expansion may well be on the horizon. “In terms of overall market potential, we are tapping less than 1%,” says 500ppm’s Puhl. “There is a lot of benefit in terms of cooperation among offset providers.”

“The Kyoto Protocol is a train wreck for forestry,” says CCBA’s Niles. “It is a fossil fuel treaty and a plantation treaty. It does not address the core of the problem from a forestry perspective.”

“So the voluntary market is very important. It is going to establish whether forestry can be a carbon credit. And that’s going to be important to the post-2012 discussion,” he continues. “You’re never going to get the US involved without voluntary credits.”

As a result of this belief, CCBA has developed a standard—backed by prominent non-governmental organizations and companies—to establish standards for good forestry project design and good

monitoring. And the offset providers themselves have undertaken measures to ensure the integrity of the market—from the independent scientific review panel employed by myclimate in Switzerland to project auditing under the terms of the World Resources Institute’s GHG Protocol on the Chicago Climate Exchange (CCX) in the US.

Given the rapidly expanding opportunity, a growing number of companies—including the verifiers and validators of the CDM world—and organizations are also stepping up with offers to certify the validity of voluntary reductions. For example, the Oregon-based Climate Neutral Network offers its Climate Cool certification to everything from products that are tied to supply chain GHG reductions to offset projects themselves. And the San Francisco-based Center for Resource Solutions is working to certify TerraPass’s reductions in an effort to develop certification models—like its Green-e standard for RECs—for the future. “At this point in the industry, credibility is everything,” avers Eric Carlson, president of offset provider Carbonfund.org.

Huge market growth may, in the end, justify both forestry and technology based offsets. “The pendulum is currently swinging away from forestry. People seem more comfortable with technology,” says The CarbonNeutral Company’s Shopley. “Once people understand that there are complex issues related to technology offsets that we haven’t really grappled with yet...”

“I’m reasonably sanguine that forestry sequestration will be there.”

David Biello is the US Editor for Environmental Finance magazine and a freelance writer based in Brooklyn.

This article was first published on the Ecosystem Marketplace on September 14, 2005.

Climate Change and Forestry: A REDD Primer

by Erin Myers

One of the most contentious issues in the debate over how to tackle climate change is the role of REDD (Reducing Emissions from Deforestation and Forest Degradation) in market-based mitigation strategies. The Ecosystem Marketplace summarizes the key issues.

In 2007, more than 50,000 fires raged through the Brazilian Amazon, reducing what were once lush rainforests to charred plains stretching to the horizon. Meanwhile, on the other side of the world, fires on the island of Borneo consumed millions of hectares of old-growth forests.

Drenched by more than 75 inches of rain annually, neither the Amazon nor Borneo have ecosystems that are naturally adapted to fire. Instead, these fires were set with the express purpose of clearing the forest – to open the land for soy production and cattle farming in the Amazon and for palm oil plantations in Borneo. While fires consumed these forests harboring some of the world’s most diverse ecosystems, they released the carbon that had been stored in the trees’ woody matter for as much as 1000 years.

Land-use change, such as the conversion of Amazonian forests to industrial mono-crop agriculture, accounts for approximately 20% of global greenhouse gas emissions – more than the emissions from the transportation sector worldwide. The majority of these land-use change emissions come from deforestation in developing countries, where forests are being cleared for agriculture and timber. Currently, the international climate change community is considering how to create incentives for reducing emissions from deforestation and forest degradation – or “REDD”.

Forests and Carbon Emissions

Forests play an integral role in mitigating climate change. Not only are they one of the most important carbon sinks, storing more carbon than both the atmosphere and the world’s oil reserves, they also constantly remove carbon from the atmosphere through photosynthesis, which converts atmospheric carbon to organic matter.

But while forests are working diligently to clean up the carbon we have emitted through burning fossil fuels, deforestation is pumping carbon right back into the atmosphere.

The Drivers of Deforestation

Deforestation in developing countries is frequently driven by agriculture, logging, and road expansion. Rising prices for soy, palm oil, and beef make it increasingly profitable for landowners in developing countries to clear forests and convert the land to agriculture. Often, burning is the

cheapest and easiest way to clear the land.

Contrary to popular belief, when logging occurs, only a fraction of the wood that is cleared ends up as dimensional lumber and eventually in housing and other structures. The majority of the forest vegetation ends up as waste, and thus the majority of the carbon from the forest ends up in the atmosphere.

Contrary to popular belief, when logging occurs, only a fraction of the wood that is cleared ends up as dimensional lumber.

And it's getting worse as policies that expand road infrastructure provide access for loggers, farmers and homesteaders to the previously inaccessible forest interior.

Deforestation Highest in Indonesia and Brazil

Deforestation is not evenly distributed around the world. In fact, Indonesia and Brazil account for 50% of the world's deforestation emissions. Because of these deforestation emissions, Indonesia and Brazil are ranked third and fourth among the top greenhouse gas (GHG) emitting countries. If Indonesia and Brazil were able to abate their deforestation, their ranking would fall to 15th and eighth, respectively.

The irony is that we normally associate high GHG emissions with development and increasing GDP, but the activities that drive deforestation generally have low economic returns. Thus, Indonesia and Brazil are among the top GHG emitters, but their emissions are from low-return activities.

Low-Cost Emission Reductions

Analyses examining the cost of REDD activities indicate that abating deforestation is one of the most cost-effective ways to reduce emissions. In their conservative calculations, the Intergovernmental Panel on Climate Change (IPCC) estimates that approximately 25% of deforestation emissions can be abated at a cost of less than \$20 per metric ton of carbon dioxide (tCO₂).

By comparison, the market price for carbon on the European Union Emissions Trading Scheme (EU ETS) was \$35/tCO₂ in the first quarter of 2008. It is important to note that the IPCC's cost estimates are based on the opportunity cost of probable land uses and don't include transaction costs such as monitoring, enforcement, and capacity building.

The Role of REDD

Given the magnitude of deforestation emissions and the low cost of abating those emissions, REDD is poised to play a very important role in the global strategy to abate GHG emissions.

"We cannot solve the climate problem if we do not include forests," said Stuart Eizenstat in testimony before the House Select Committee on Energy Independence and Global Warming. A former Under Secretary of State in the Clinton Administration, Eizenstat now advocates the need to include market-based incentives for REDD activities in any future climate-change policy.

In addition to the benefits from reducing emissions, REDD activities can protect the biodiversity and important ecosystem services provided by tropical rainforests.

Although Eizenstat and others see REDD as an opportunity to collaborate with developing countries to shore up a huge source of emissions at relatively low cost, there are no incentives to pursue REDD in any of the market-based mechanisms of the Kyoto Protocol.

Banishing REDD from Kyoto

In 1997, the Kyoto Protocol laid out target emission reductions and the different mechanisms by which countries could achieve those targets. In order to achieve target emissions levels, countries had two options: either take actions to reduce their own domestic emissions, or pay someone else to reduce their emissions and thus offset the country's domestic emissions with reductions somewhere else.

The Kyoto Protocol established the rules and financing structures surrounding different types of offset mechanisms. At that time, the Parties to the Protocol excluded REDD from the offset mechanism because of uncertainties about the magnitude of deforestation emissions and the ability to monitor deforestation.

The Kyoto Protocol does recognize credits from reforestation and afforestation – the first being when you replant forests that have recently been chopped down or otherwise destroyed, and the second being when you plant forests that have either been gone for quite some time or never existed. Both can be used to generate offsets under the Kyoto Protocol's Clean Development Mechanism (CDM), but only if they meet a narrow definition of success.

Because of their exclusion from regulatory markets, REDD credits have been limited to the voluntary market, where a handful of projects are generating credits. These credits are sold at a fraction of the regulatory market price to buyers concerned about reducing their carbon footprint for reasons other than compliance with the law, as documented in *State of the Voluntary Carbon Markets 2008*, published by the Ecosystem Marketplace and New Carbon Finance.

Bali: REDD Rising?

The outlook for REDD changed at the 2005 Conference of the Parties in Montreal. Costa Rica and Papua New Guinea, on behalf of the Coalition for Rainforest Nations, proposed to give developing countries access to the carbon market through credits generated from REDD activities. In response, the United Nations Framework Convention on Climate Change (UNFCCC) launched a two-year initiative to examine the potential of REDD. Those two years culminated at the 13th UNFCCC Conference of the Parties (COP 13) in Bali.

Officially, the Bali decision was quite modest. The Bali Action Plan formally listed REDD among other mitigation activities as a potential means to achieve emissions targets and encouraged voluntary action on REDD. The decision of whether and how REDD will fit into the international climate mitigation strategy was put off until COP 15 in 2009 in Copenhagen.

And yet, Bali was a turning point for REDD.

“Bali put REDD on the broader COP agenda,” explains Tracy Johns, Policy Advisor and Research Associate at Woods Hole Research Center. “Bali legitimized REDD as a tool for the UNFCCC’s broader strategy to mitigate climate change, and put it on the same track and timeframe as the post-2012 discussion.”

The Bali decision sent a signal that the international climate change framework will take on the problem of emissions from deforestation, but the financing mechanism is far from decided.

Still, the Bali decision encourages capacity building and the development of pilot projects. By ameliorating some of the uncertainty about the future of REDD, the Bali decision encourages developing countries and project developers to begin investing in REDD activities.

Three Shades of REDD

Broadly speaking, you can break all REDD activities into three categories: project-based, policy-based, and sectoral.

1. **Project-based REDD** activities would generate credits based on the maintenance of carbon stocks in a localized area.

Many of the current REDD projects focus on forest conservation that creates reserves and parks to protect threatened forests. These place-based REDD projects preserve the carbon stocks on a parcel of land that otherwise would be deforested.

2. **Policy-based REDD activities** would generate credits by reforming land use policies in a manner that would lead to reduced deforestation.

Emissions from deforestation can be reduced by land use policies. Agricultural subsidies, for example, often create incentives to deforest, and transportation networks provide access to clear forests and remove timber. Reforming land use policy could lead to significant reductions in forestry emissions, just as reforms in energy policy are expected to reduce emissions rates in the electricity sector.

3. **Sectoral REDD activities** would generate market-based credits by reducing net deforestation rates over an entire country.

A country or province could take on an emissions cap in the forestry sector in which they would commit to a target emissions rate from forestry. For some developing countries, actively pursuing emissions targets in the forestry sector might be the most appealing and powerful way for them to participate in the global effort to mitigate climate change. Eizenstat points out that the voluntary participation in sectoral targets in the forestry sector could create “a model for other developing countries to take targets in other sectors, such as electric power or transportation.”

These three shades of REDD – project, policy, and sectoral targets – capture the different scales at which REDD activities could be implemented, and each have their own set of strengths and weaknesses.

An Argument for Every Shade

Project-based REDD activities could be modeled after the forestry CDM, and there are a number of project developers ready to begin investing in REDD projects. However, the CDM model has its strengths and weaknesses.

Because REDD projects would be geographically-bound, they would be easier to implement than sectoral or policy-based activities. There are, however, also a number of technical challenge that must be overcome – such as minimizing and accounting for “leakage”, which is what happens when preventing deforestation in one place encourages it somewhere else. This is dealt with in more detail under the heading Technical Issues.

Further, emissions from deforestation account for 20% of global carbon emissions, and there is concern that there would never be enough REDD projects to have a meaningful impact on the large magnitude of emissions from deforestation.

In contrast to project-based activities, policies and sectoral caps that reduce emissions from deforestation may be better matched to the scale of the problem. Consequently, they would also require more coordination, and some countries don't have a sufficiently strong central government or the proper governance institutions to monitor and enforce these programs.

In reality, countries currently have very different capacities on the ground to implement REDD activities. A climate change policy could allow a spectrum of REDD activities, creating incentives for countries to take actions at the most appropriate scale for them. All three shades of REDD face a number of technical and policy-design challenges that must be addressed to ensure an environmentally robust REDD mechanism. These challenges differ with each shade of REDD. For example, projects that maintain carbon stocks on a hectare of land would require different accounting mechanisms than sectoral caps that reduce emissions rates over a country's entire forests.

Potholes on the Road to Copenhagen

Although uncertainties still linger, the technical sub-committee that focused on REDD for the two years leading up to Bali concluded not only that the magnitude of deforestation emissions was significant – approximately 20% of global emissions – but that sufficiently cost-effective methodologies exist for measuring forest carbon and monitoring deforestation.

Support of the measurement and monitoring methodologies was a significant first step in overcoming the technical challenges that face the implementation of REDD policies, but there are a number of additional hurdles (technical and political) that lie on the road from Bali to Copenhagen.

All three shades of REDD face a number of technical and policy-designed challenges that must be addressed to ensure an environmentally robust REDD mechanism.

Technical Issues

Leakage means that preventing deforestation in one place might actually encourage deforestation somewhere else. It could, for example, take the form of the actual deforestation agents shifting their equipment and labor to a nearby patch of forest. But it can also be less direct. If REDD activities force up the market price of timber, livestock, and crops, they could drive deforestation somewhere else.

Leakage means that preventing deforestation in one place might actually encourage deforestation somewhere else.

Unless all global forests are included in a REDD policy, leakage cannot be eliminated; however, it can be minimized through careful project design. Further, leakage can be accounted for by requiring that a percentage of a project's REDD credits be held in reserve and not be sold (the so-called "buffer" approach). In this manner, the reserve account would offset or neutralize the leakage that was assumed to have taken place.

Concerns over permanence are rooted in the idea that emission reductions are potentially reversible due to forests' vulnerability to fires, pest outbreaks, changes in management, and other natural and anthropogenic disturbances. However, the scale at which REDD activities are implemented affects the risk of impermanence. For example, as you move to policy- and sectoral-scale activities, credits would be generated based on net deforestation rates over some political jurisdiction.

As a result, you are not bound to maintaining forest carbon in any one specific location, and increases in deforestation in one place can be offset with reducing deforestation somewhere else. As you move to scale, there is greater flexibility in how land is managed, and there is greater impermanence in any specific site.

Too Much of a Good Thing?

Because REDD credits are expected to be relatively inexpensive, there is concern that a mechanism that incentivizes REDD activities will flood the regulatory market with cheap credits, deflating the price of carbon and shifting attention away from low-carbon technologies such as carbon capture and storage.

The realistic extent of this concern depends on the extent to which REDD projects can be implemented and begin generating credits. While the potential for REDD credits is high, it's not clear how much of this potential could be realized in a timely fashion. In reality, because many countries need to develop on-the-ground capacity before they can begin generating REDD credits, fears of a deluge may be over-stated.

Even so, the decision about whether to include REDD credits in a cap-and-trade program cannot be separated from the negotiations about future emissions targets. More aggressive emissions reductions targets would neutralize any effects on the price of carbon.

Policy Design Issues

Even more challenging are the policy design issues that will decide the extent to which a REDD instrument will interact with the over-arching climate change mitigation strategy.

In 2005, the Coalition for Rainforest Nations proposed creating market based incentives for REDD activities – arguing that because market prices for agricultural goods drive deforestation in many countries, then international prices for carbon would drive forest conservation if REDD is allowed into a global carbon-trading scheme. This, they said, would offset the incentive to chop down forests for agriculture, while enhancing economic development.

How do you prove that a REDD regime actually saves a forest that is in danger of being chopped down?

Some countries, however, oppose linking REDD activities to the compliance carbon market and favor creating a fund

where REDD activities would be financially rewarded. Proponents of the fund approach argue that linking REDD credits to the carbon market will delay the transition of developed countries to low-carbon technologies and will restrict developing countries in their ability to reform land use policies.

Additionality and Baselines

As if leakage and permanence aren't difficult enough issues to wrestle with, how do you prove that a REDD regime actually saves a forest that is in danger of being chopped down?

The typical answer is “baselines”, which are the yardstick by which countries measure whether they have successfully reduced deforestation or not. There is confidence in the ability to establish historic deforestation rates based on existing remote sensing imagery, but many regions and countries argue that historic rates don't indicate the current risk of deforestation.

For example, some countries currently experiencing political instability have a low rate of deforestation because the domestic turmoil suppresses access to forests and markets. They argue that deforestation pressure will increase if the domestic situation subsides, and that the historic baseline thus underestimates the real pressure on the forests.

And what about countries that have already taken action to prevent deforestation? Some argue that countries with low rates of deforestation should be rewarded to avoid creating a perverse incentive for these countries to increase deforestation in order to then qualify for REDD incentives. However, in order to maintain the environmental integrity of a REDD policy, credits can only be generated by additional reductions in emissions from deforestation, and these countries would have to be rewarded through other means.

Co-Benefits and Sustainable Development

REDD activities are often touted because of the added benefits that come with preventing deforestation, such as preserving ecosystems and encouraging sustainable development.

“Investors express a preference for and will pay a premium for projects that demonstrate social and environmental benefits in addition to robust climate benefits,” observes Joanna Durbin, Director of

the Climate, Community & Biodiversity Alliance (CCBA) that developed a design standard for climate change mitigation projects to ensure the projects are designed to support sustainable development and biodiversity in addition to their carbon benefits.

“The needs of indigenous communities should be addressed when action is taken to reduce emissions from deforestation and forest degradation in developing countries.”

Although the Bali agreement recognizes that “reducing emissions from deforestation and forest degradation can promote co-benefits,” Durbin and others are concerned that if REDD-generated credits move into a compliance market, the incentives for multiple benefits will be lost.

REDD policies promise to face all of the governance and equity challenges that have marked the international climate policy negotiations. The long-term success of REDD activities on the ground relies on ensuring that the priorities of forest-dependent communities are met and the benefits from REDD activities reach the communities bearing the burden of forest stewardship.

The Bali agreement recognizes the importance of forest-dependent communities, stating: “The needs of local and indigenous communities should be addressed when action is taken to reduce emissions from deforestation and forest degradation in developing countries.” However, critics argue that local and indigenous communities currently don’t have a voice at the negotiations table, and thus their needs are not being heard.

Two-Year Sprint

There is much work to be done. In December, 2009, the Parties will meet in Copenhagen to negotiate new target emission levels. Further, the parties will decide the mechanisms by which countries can meet those targets, including whether REDD will be incentivized through market-based incentives, or if REDD activities will be accomplished through a fund that rewards countries for measurable, reportable and verifiable reductions in emissions from forestry.

Though much ink will be spilled over the next 2 years addressing the technical and policy challenges facing REDD, the role that REDD will ultimately play in achieving global emissions targets depends on the on-the-ground capacity to implement REDD activities. “Readiness for REDD”, a term often used for the technical and institutional capacity to implement REDD activities, varies tremendously from country to country and province to province. In an effort to build capacity for REDD a handful of new initiatives have been launched to improve readiness among key developing countries.

Priming the Pump

At COP-13 in Bali, the World Bank launched the Forest Carbon Partnership Facility (FCPF), a \$250 million fund focusing exclusively on REDD. In its first stage, the FCPF will help about 20 developing countries to build capacity to implement REDD activities. These capacity-building activities could include helping to assess national forest carbon stocks and sources of forest emissions, define past and future emission rates, calculate opportunity costs of REDD activities, and design REDD strategies. Australia launched a similar fund called the Global Initiatives on Forests and Climate

(GIFC) that will focus on Southeast Asia and the Pacific.

The challenges facing the incorporation of REDD into mainstream climate change policies are not trivial. However, the potential rewards from getting it right stretch beyond the emission reductions themselves and include the sustainable development of forest-dependent communities and the conservation of some of the world's richest forest ecosystems.

With the World Bank's Forest Carbon Partnership Facility (FCPF), the Australian government's Global Initiative on Forests and Carbon (GIFC) and other funds catalyzing REDD activities on the ground, and the clock already ticking on the UNFCCC's countdown to a decision at Copenhagen, the next two years offer a unique opportunity to shape how the world's forests can join the fight to mitigate climate change.

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This article was first published on the Ecosystem Marketplace on May 19, 2008 and has been adapted from the report "Policies to Reduce Emissions from Deforestation and Degradation (REDD) in Tropical Forests" published by Resources for the Future.

REDD Hot in Bali—and Very Confusing

by **Steve Zwick and Katherine Hamilton**

Most people attending the Climate Change Conference in Bali agree: avoided deforestation, often referred to as REDD (Reduced Emissions from Deforestation and Degradation), will play a role in whatever regime replaces the Kyoto Protocol once it expires in 2012. But as the Ecosystem Marketplace finds out, the devil – and debate – is in the details.

“I believe that deforestation will have to be an important component of a future climate change regime beyond 2012, in both adaptation and mitigation strategies,” stated Yvo de Boer, Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC), after a week of apparently difficult but very opaque negotiations at the 13th Conference of the Parties (COP 13) in Bali, Indonesia.

The statement came on Saturday, two days after he announced the formation of the Working Group on Reduction of Emissions by Deforestation and Degradation (REDD) in Developing Countries, designed to come up with a mechanism for recognizing carbon offsets from avoided deforestation.

It was the kind of statement that would have been unthinkable five years ago, before a number of groups –including one called the Coalition of Rainforest nations, which is made up of several countries (the leaders being Papua New Guinea and Costa Rica) with support from NGOs—came together to put forestry on the agenda in a big way at the 11th COP in Montreal in 2005. The battle to bring deforestation back into the climate negotiations may have been won, but it comes as many NGOs are just beginning to realize how complicated the REDD procedures are, and how various are the ideas regarding how to fit it into current Kyoto carbon markets.

All of which has led to disappointment among many in the scientific community, who say negotiations are taking far too long and becoming far too complex to provide the necessary immediate action.

“I had the impression before I came here (to Bali) that the big debate was more or less over, and that all we’d be talking about was how to proceed,” said Annette Freibauer, who has studied the biochemical impact of biodiversity on the Amazon rainforest for Germany’s Max Planck institute. “But then the negotiations started with a very bad temper and this indigenous group said that REDD is the worst thing you can do to indigenous people.”

The indigenous group in question is the International Forum of Indigenous Peoples on Climate Change (IFIPCC), which demanded that the COP “refrain from adaptation and mitigation schemes and projects promoted as solutions to climate change that devastate Indigenous Peoples’ lands and territories and cause more human rights violations, like market based mechanisms, carbon trading, agrofuels and avoided deforestation (REDD).”

“That’s really a question of implementation rather than the mechanism itself,” says Freibauer, “and it’s a surprise to me that we started with an issue that seemed to be positively seen by everybody, and suddenly there’s a lot of pressure to slow down the process.”

Perhaps, but the more you talk to participants, the more you see their concerns aren’t that far apart.

“It’s critical that whatever mechanism we come up [with] gets benefits to the 1.4 billion people who depend on the forests for their survival.”

“Some very vocal groups have concerns, and they’re often the same groups that came up before, and their concerns have to do with ensuring that you get benefits to local communities,” said Andrew Mitchel of the Global Canopy Program. “It’s critical that whatever mechanism we come up gets benefits to the 1.4 billion people who depend on the forests for their survival.”

“Forestry is being taken seriously for the first time in a long time,” said Bill Stanley of The Nature Conservancy (TNC). “In fact, I’d say that there’s a consensus that the technical issues that a lot of people thought were the major obstacles to these types of projects are not the major obstacles. The most difficult thing is coming up with strategies for protected forests that will work for local people and for the governments involved, and that will be sustainable.”

Perhaps, but de Boer said that technical issues such as validation and quantification remain a sticking point moving forward – prompting David Pearse of a group called OSMIA Partners, LLP to again call for a more streamlined process that steers clear of detailed prescriptions. He believes the United Nations should give more leeway to financial markets in hammering out the details; on the premise that buyers of climate risk, in whatever form, will kick all the tires to avoid being stuck with a lemon down the road.

Likewise, because of the challenges of commoditizing REDD activities into the general carbon markets, several groups have proposed that REDD activities be separated from the current Kyoto carbon markets.

Greenpeace, for example released a proposal for a “Tropical Deforestation Emission Reduction Mechanism” which proposes leaving REDD out of the Clean Development Mechanism and instead creating a separate commodity called “Tropical Deforestation Emission Reduction Units.” The demand for these units would be a mandatory minimum commitment by developed countries to help finance tropical forest conservation, and such credits could be used to purchase Kyoto compliance credits, but only in a very limited capacity.

While REDD’s integration into the Kyoto context was a central theme of last week’s discussions in Bali, numerous side event speakers reminded participants that Kyoto carbon markets are not the only option for valuing forests and using a market- based approach to conservation.

Thinking Beyond Carbon

One theme that has emerged in virtually all deforestation workshops is the sense that better methods are evolving to quantify biodiversity as an ecosystem service, but that implementing pricing schemes based on these methods remains a few years away. At one side event, Dr Antonio Nobre of Brazil's National Institute of Amazonian Research delivered a frightening presentation on the biochemical impact of biodiversity on the atmosphere, the upshot being: you can maintain the same level of carbon in the Amazon short-term and still lose the forest and the weather patterns it maintains if you disrupt the blend of species growing there.

But the lack of current mechanisms for quantifying the actual benefits of biodiversity has skewed attention towards pure carbon, said Charlotte Streck, director of Climate Focus in the Netherlands, at a Saturday side event. "The title of this event here is 'Harmonizing the Rio Conventions', and we have 20 or 25 people," she said. "If we had called this same event 'REDD: Harmonizing the Rio Conventions', we would have a full room."

Streck, together with Robert O'Sullivan, pioneered the Carbon Stock Approach, which aims to reward any groups that place land into permanent protection with an escrow account initially valued based on the carbon content of the land, but gives the owners of the land the ability to capitalize on other ecosystem services as they become clear and quantifiable. Under such schemes, an escrow account is created to hold funds that are only paid out to land-owners if certain conditions are met, and these funds are then used to finance the maintenance of the land in its pure state by funding forest rangers or stimulating eco-friendly businesses. The idea is that the real money will begin to flow in from payments for biodiversity services and other ecosystem services as the field evolves. Investors in the fund can then – along with the owners of the land – benefit from those services.

"NGOs and the private sector are saying, 'This is something we can invest on,'" she says. "It's more saleable because we're simply raising money for conservation and not bogging down in talk about leakage and whatnot. That is what we need to get this ball rolling." She said such an approach should not be viewed as an offset mechanism because that would make it too easy for someone to destroy an ecosystem in one part of the world and replenish one somewhere else. She also acknowledged the difficulty of coming up with a global trading regime based on such a program, due to the lack of commoditization in biodiversity, but said holders of land in such escrow accounts should be allowed to harvest carbon credits as well.

Similar projects are already underway. As was mentioned in a previous article groups such as Sustainable Forestry Management (SFM) and New Forests have recently arranged hundreds of millions of dollars in financing for forestry projects (with possible carbon benefits) in the developing world (among them the creation of forest buffer zones in Central Africa to protect the last remaining wild gorillas, and the conservation of Amazonian forests in Peru threatened by logging companies), and both Mitchell and Pearse say they will be announcing similar ventures soon.

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This article was first published on the Ecosystem Marketplace on December 10, 2007

Voices from the Field: People, Places and Opinion

People: From Ugandan Schoolteacher to International Carbon Consultant: A Profile of Beatrice Ahimbisibwe

by Ricardo Bayon

For years forestry carbon—paying for the carbon sequestered by trees—has been the subject of intense debate among those interested in the world’s carbon markets. Critics claim these projects are all about greenwashing, naysayers say they are difficult to monitor and skeptics charge they lead to large plantations of eucalyptus. But, while the debate around forestry carbon rages, a forestry carbon project in Uganda has benefited local communities, local biodiversity and local businesses while, arguably, helping the global climate. The Ecosystem Marketplace profiles Beatrice Ahimbisibwe, one of the program’s local participants.

When Beatrice Ahimbisibwe—a widow, single mother, and school-teacher living in western Uganda—first signed the contract agreeing to sell carbon sequestration credits from her small parcel of land, her neighbors thought she was crazy. Ahimbisibwe’s neighbors weren’t sure what carbon dioxide was, how it was made or where it went, let alone who would want to pay for it.

“You are giving away your land for nothing,” local residents told her. “One day they’ll just come and take it.”

Although she didn’t believe them, Ahimbisibwe admits the reactions of those around her gave her a bit of pause. She decided, nonetheless, to go through with the deal because—as she had often instructed her students—she felt protecting the environment was the right thing to do.

And so, in June 2003, two years before the Kyoto Protocol was even ratified (let alone accepting forestry-based carbon credits from Africa), Ahimbisibwe entered into a contract with ECOTRUST, a Ugandan NGO, who, working with a variety of international organizations (including the Edinburgh Centre for Carbon Management, or ECCM), agreed to buy Ahimbisibwe’s carbon. In return for carbon payments, Ahimbisibwe—along with 30 other landowners in Uganda—agreed to sell the rights to the carbon sequestration generated by planting native species of trees on their land.

Extremely Fortunate

Despite the many difficulties she has had to face, Ahimbisibwe believes she is fortunate to live near the village of Bushenye, in the Bitereko sub-county of southwestern Uganda. The country is marked by a stunning set of lush, plantain-covered mountains and dotted with incredibly deep jade-green crater lakes that rise from the rift valley at Africa's center. A few kilometers down the road from Ahimbisibwe's farm, lies Queen Elizabeth National Park: a land of elephants, lions, antelopes, hippos, and, improbably, chimpanzees. Not far away, the famous Rwenzori—"mountains of the moon"—provide some of Africa's last refuges for mountain gorilla.

For a land rich in natural beauty, Ahimbisibwe's home is also desperately poor. In this, again, she is luckier than most. The starting salary for a secondary school teacher in her part of Uganda is \$150 per month, and Ahimbisibwe has been teaching for more than 16 years now, so she probably makes more than that. This compares to an average salary for that part of Uganda of \$70 a month. Besides, Beatrice, because she is a Geography teacher, has read about (and taught about) pollution, the environment, the problems of global warming, and the Kyoto climate change treaty.

In addition to all this, Beatrice has for some years been a member—indeed the chosen leader—of a local women's collective called the Bitereko Women's Group, and is the Chairperson of a local micro-finance institution. So she has had experience working with loans and grants, filling out forms, and writing reports.

"In fact," says Byamukama Biryahwaho, the program officer in charge of the carbon project at ECOTRUST, and one of the program's architects, "that is how we found Beatrice. At ECOTRUST we've had a number of projects in this part of Uganda. First, in 1999 we provided a grant to the Bitereko Women's group to set up woodlots, obtain energy-saving stoves, and get involved in sustainable agriculture. Then, in 2002, we helped provide goats to the local women. In both these cases, the Bitereko Women's group performed admirably: they were great at writing reports for the grants. In fact, they have been so good at getting resources for their members that now men are beginning to try and join the group. So, when we began working with ECCM on a project to pay local farmers to sequester carbon, we knew this group [of which Beatrice was a part] would be a good one to start with."

Jessica Orrego, Biryahwaho's counterpart at ECCM in Scotland, explains: "Generally speaking, the decision was made to work in Bushenyi because ECOTRUST (and CARE) already had a presence there. It was decided to approach organized community groups as a way to attract farmers with some level of organizational capacity. Also, access to these farmers was facilitated through the leaders of these groups."

In exchange for agreeing to plant native species of trees on their land, they could receive payments for the carbon they would be sequestering.

Enter the Carbon Markets

That is how Ahimbisibwe got involved in the carbon markets. In 2002 and 2003, ECOTRUST, together with its technical partners, ICRAF, CARE, LTS International, and ECCM, began talking to farmers in Uganda about carbon, climate change, and the possibilities available to them through the sale of carbon sequestration credits. They told farmers that in exchange for agreeing to plant native

species of trees on their land, they could receive payments for the carbon they would be sequestering, payments that would come from individuals and organizations in developed countries contributing to global warming.

“At first,” remembers Ahimbisibwe, “we weren’t sure what this was all about. We couldn’t understand how or why anyone would want to pay us for the air our trees use. For us carbon was something to do with burning wood and with charcoal. But after it was explained to us in terms of pollution, and how our trees would help reduce pollution, it began to make more sense.”

In any case, Ahimbisibwe says the deal that EcoTrust was offering looked pretty good. She had land she was not using and she was happy to plant native trees that would benefit the environment and provide her with extra income. The process, however, was daunting. Interested farmers had to prepare applications that included clear indications of the land they intended to put into the program—including some form of proof of ownership—as well as obtain the signatures of all family members undertaking to protect the trees for the requisite amount of time.

Ahimbisibwe says that once she got over the initial paperwork, her particular deal was relatively straightforward: She agreed to clear and plant a hectare of her land with native species of trees. In return, experts determined she would generate 57 tons of carbon sequestered over ten years (assuming the trees survived) and would be paid US\$8 per ton, for a possible total of \$456 over 25 years. Additionally, Ahimbisibwe would be able to recoup any other benefits from the land, as long as the trees themselves weren’t harmed: she could let her goats graze the land, she could use any wood pruned from the trees and, after some 15 years, she could use/sell the wood. In order to protect against unforeseen eventualities, all of the program participants also agreed to set aside 10% of their carbon and not sell it. In other words, for the 52 or so tons of carbon she would be selling, Ahimbisibwe would be getting paid \$416 in installments. The first installment of 30% (or around \$120) would be paid up-front, once the land was planted. Thereafter, the plantings would be monitored and payments would be made as follows: 20% 1 year after planting the whole plot, 20% in year 3, 10% after year 5, and 20% after year 10.

A Living Pension Fund

Although the regular payments are nice, Ahimbisibwe says that what really sold her on the carbon sequestration project was the prospect of selling the timber 15-20 years down the line.

“In 20 years I will be retiring from my job as a teacher,” she explains, “and the money I get from selling the timber will be very useful for me and my children.” In other words, given the limited social security system in Uganda, and considering she is a single mother with little available capital (and nowhere local to invest it if she had it), Beatrice is putting her retirement in the hands of her land and living trees; a sound—if not positively solid—investment decision. Not only is she using a piece of land that wasn’t being used otherwise, but she is also getting some up-front capital (the carbon payments) to help subsidize her investment in retirement. And she is doing all of this at the same time that she helps address global warming. It is unlikely that even the best Wall Street pension fund advisors would be able to come up with such a financially prudent (not to mention socially responsible) pension investment plan given Beatrice’s unique circumstances.

Ironically, Ahimbisibwe's major concerns about the carbon sequestration program are not about the rigorous contractual processes to date, but about what will happen if the program succeeds. She explains that she and her neighbors are worried about some of the unforeseen consequences of once again having native vegetation. "What happens," she asks, "if the old species of trees come back, and as a result, we see some of the wild plants and animals come back?"

The return of wildlife seems an obvious positive for Northern environmentalists, but for the people of Uganda, the issue is more immediate. Ahimbisibwe explains that, with native trees come native monkeys that steal food and damage crops. Native species of venomous snakes such as tree vipers and rhinoceros vipers also may reappear. "This," says Ahimbisibwe, "is what we worry about. In some ways we would be more comfortable planting eucalyptus."

Eucalyptus would have been the easy choice in others ways too: Eucalyptus seedlings, paradoxically, are easier to get in Uganda than seedlings of the native African cherry (*Prunus africanus*), Musizi (*Maesopsis eminii*), Funtumia, and Khaya that Ahimbisibwe and her colleagues are planting. "Many of us didn't even remember these trees," says Ahimbisibwe, "but some of our older neighbors recognized them right away as the trees of their childhood. This makes us proud."

Where are the Buyers?

The use of native species is also something of great interest to carbon buyers who, in this case, are mostly in Europe. Bill Sneyd, the Director of Operations for The Carbon Neutral Company (formerly known as Future Forests), represents one of these buyers. According to Sneyd, having forestry options can be "hugely valuable in terms of communication and raising awareness, particularly if there is also a community angle."

He explains that buyers of voluntary carbon, unlike buyers for the regulated carbon markets established by Kyoto and the European Union's Emissions Trading Scheme (EU-ETS), actually prefer forestry carbon. "There is something," he says, "about growing trees that serves as a simple and engaging way to communicate what we are doing [in terms of buying and selling carbon]...In many ways it is easier for buyers to get engaged with these projects than it is for them to get engaged with technology projects [wind turbines, etc.]" He notes that his company, for this reason, has decided to keep an important part of its portfolio in forestry projects such as the one in Uganda. He says that in the voluntary carbon markets, his company's specialty, having a certain amount of forestry operations can be "hugely valuable in terms of communication and raising awareness, particularly if there is also a community angle." "People like the connection to trees," he adds, "and they also like the feeling that they are contributing towards helping people's lives."

According to Sneyd, having forestry options can be "hugely valuable in terms of communication and raising awareness, particularly if there is also a community angle."

By way of example he notes that many of the celebrities in the music and entertainment industry, people like Coldplay, Leonardo di Caprio, Dido, Mick Jagger, Pink Floyd, some of which are customers of The Carbon Neutral Company, specifically request forestry projects. "The band Coldplay is a great example of this," says Sneyd, "In offsetting the carbon emissions of their two

latest albums, they specifically requested forestry projects in developing countries. At first, they were involved in a project in India, but more recently they have been involved in a forestry/community project in Mexico. And they have gotten so excited and engaged that they are talking about visiting the project after one of their upcoming tours in Mexico... It all just makes for such a superb and multi-faceted story that it draws people.”

“I guess,” he continues, “there is a history of musicians getting into forestry-type projects.” It should therefore come as no surprise that of the 10,000 tons of sequestered carbon that The Carbon Neutral Company bought from the project in Uganda, a portion has already been allocated to offset the carbon emissions of the massive “Live 8” benefit concert that took place this summer in Scotland.

Sneyd says part of the reason his company chose to invest in the Uganda credits is due to the fact that “they are part of the Plan Vivo system developed by ECCM.” (for more on the Plan Vivo system, see www.planvivo.org) He explains that this system, which “has been developed, perfected, and refined over more than 8 years,” gives TCNC the necessary assurances that the project has been adequately designed, measured, and monitored. “It would have been a lot more difficult to invest in the Uganda project if it hadn’t been part of the Plan Vivo system. It just gives us confidence that the carbon we are paying for—and the community benefits we want—are truly there.”

Carbon as Business Strategy

Although TCNC has recently bought 10,000 tons of carbon from the ECCM-ECOTRUST project in Uganda, they did not buy Ahimbisibwe’s carbon. Her 57 tons of carbon were sold to Tetra Pak UK, the UK branch of the large multi-national food packaging company. Indeed, Tetra Pak UK is the largest single buyer of Ugandan carbon. Every year they buy around 8,000 tons from the Ugandan project to offset their emissions.

“In essence,” explains Samantha Edgar, Environment Officer for Tetra Pak UK, “we like the idea of investing in growing trees because it links back to our everyday business of producing packaging which is largely tree-based...[W]e see our offsetting program as a way of pre-empting [compliance with] climate change regulations that will likely affect us more and more in the future. We also see this as a way of strengthening our ability to dialogue with our stakeholders, and to motivate and communicate with our staff... The carbon projects are very important and fit in quite nicely with our company’s overall environmental policy.”

Since Tetra Pak began working with ECCM to develop a carbon management program in 2003, the company has created a computer-based carbon monitoring system that allows them to better gauge their carbon footprint on a yearly basis. By 2004, TetraPak UK had managed to reduce their carbon emissions by 13% as compared to their 2001 levels, and their target for 2005 has been to raise the reduction to 15% below 2001 levels. These reductions, however, don’t include offsets that, according to Edgar, are used to compensate for unavoidable emissions, thus making the company “carbon neutral”. In 2004, for instance, TetraPak UK’s carbon footprint was just over 11,780 tons, so this is the amount they are buying for that year. To date, 80% of TetraPak UK’s offsets come from the Uganda projects—including Beatrice’s carbon—while the remaining 20% comes from bio-mass and solar energy projects in India and Sri Lanka.

TetraPak UK (the only division of TetraPak currently offsetting at these levels), says Edgar, is very happy with their investment in the Uganda project. “Our carbon management program, including the offsets in Uganda, have been great stories and recently helped us win the overall Wales environmental award,” she explains. “So yes, we are quite pleased with this program.”

From Teacher to Consultant

Thousands of miles away, back in Uganda, Ahimbisibwe, too, is happy with the program. Her trees are growing nicely, and she has already received two payments for her land’s carbon. With these two payments, she has made some upgrades to her home, installed needed food storage spaces, bought furniture, and otherwise invested in her family’s future. “Oh,” she says, “you should have seen my children’s faces when the new sofa came in! They were so happy with the trees and the carbon.”

Ahimbisibwe’s neighbors were also impressed by the sizable influx of cash. “How did you do it?” they asked.

Ahimbisibwe’s neighbors were also impressed by the sizable influx of cash. “How did you do it?” they asked.

“How come they didn’t take the trees?” they wondered. “And you are going to receive more money and still be able to sell the timber in 20 years? What is the secret?”

The determined and visionary Ahimbisibwe smiles deeply as she tells the story: “I am so proud,” she says, “not only do I use my work as an example when I teach my school children, and not only do I get to talk to and meet people from all over the world, but now my neighbors come and ask me questions about my carbon and my trees. Can you believe, I have become a consultant!”

In a short period of time, Ahimbisibwe—with a little help from the world’s carbon markets—has evolved in the eyes of her neighbors; transforming herself from the schoolteacher with strange and wacky ideas into the local—and at times international—carbon consultant. If Ahimbisibwe’s story isn’t the epitome of clean and sustainable development—something that is good for the climate, good for biodiversity, good for businesses, and good for communities—then nothing else is.

Ricardo Bayon is the co-founder and a partner of EKO Asset Management Partners, a “merchant bank” for environmental markets. He formerly served as Director of the Ecosystem Marketplace.

This article was first published on the Ecosystem Marketplace on November 18, 2005.

Opinion: It's Not Easy Being Green in Aceh, Indonesia

by John-O Niles

John-O Niles of Carbon Conservation Pty. Ltd writes about the challenges of utilizing carbon finance to protect Indonesian forests.

Kermit-The-Frog's woes don't hold a candle to those of Irwandi Yusuf, current Governor of Indonesia's Aceh Province seeking to safeguard the largest remaining block of Sumatran forests. The province, which was devastated by the 2004 Indian Ocean tsunami, while striving to rebuild itself is suffering from rampant deforestation. By one estimate, the province has been losing about 49 acres of forest a day, mostly due to illegal logging, resulting in increased flooding, landslides, and biodiversity loss.¹

Realizing the need to provide financial incentives for forest conservation, Governor Irwandi has assembled a team to help Aceh Province explore the possibilities of carbon finance to justify and finance a green Aceh future.

On April 26, 2007, Governor Irwandi declared a six-month logging moratorium for Aceh. This bold move was intended to show his electorate and the international community that the Governor was serious about stopping deforestation. Governor Irwandi has personally led police raids on illegal logging camps and several unauthorized loggers are now in jail. That temporary logging moratorium expires at the end of this week—and unless some form of carbon finance soon emerges, the chainsaws could soon, again, be humming.

Realizing the need to provide financial incentives for forest conservation, Governor Irwandi has assembled a team to help Aceh Province explore the possibilities of carbon finance to justify and finance a green Aceh future. One would think that the international conservation community would be doing back flips to help conserve highly-threatened, mega-diversity forests. However, the Governor, who plans to transform Aceh into a province of responsible forest management, has struggled to find partners who share his sense of urgency.

Before delving into the details, let's start at the beginning. Born in Bireun Aceh in 1960, Irwandi always had a conservation ethic growing up. He turned his passion for wildlife into an academic career, picking up veterinary degrees from Syiah Kuala University in Aceh and Oregon State. He would go on to help Fauna and Flora International (FFI) establish an office in Aceh in the late 1990s, using his veterinary training on conservation work with the Sumatran elephant.

Aceh's quest for independence was also a driving force in Irwandi's life. In the early 1990s, he received military training in Latin America and grew to be one of Free Aceh Movement (GAM)'s top

commanders. He held positions in psych warfare and counter-intelligence. Due to his revolutionary activities, he was arrested in 2003 and held as a war prisoner in the Keudah Prison in Banda Aceh until 2004 when the devastating 2004 Tsunami hit Aceh's shores. Many prisoners in Keudah Prison perished in the waters. Irwandi punched a hole in the ceiling and narrowly escaped. He then fled.

When the unbelievable human loss of the tsunami was realized, negotiations were hastened for a truce between the Government of Indonesia and GAM. An amnesty was declared for former fighters and Irwandi helped broker negotiations for Aceh's August 2005 autonomy deal. And at the end of 2006, Irwandi was chosen by the people of Aceh as a freely-elected governor.

Less than five months after taking office, in April 2007 Governor Irwandi held a critical press conference in Bali with two other "green" governors. They were eager to prevent rampant deforestation in their provinces and announced measures to immediately stem deforestation, ranging from a logging moratorium in Aceh to a review of logging permits in Papua. (Papua Governor's Barnabas Suebu recently won one of Time Magazine's Heroes of the Environment Award for his work).

In Bali Governor Irwandi also signed a Memorandum of Understanding with Carbon Conservation Pty. Ltd. The Governor asked our company and Fauna and Flora International to help Aceh tap the emerging interest in carbon finance for reducing emissions from deforestation in developing countries (REDD). We focused our efforts on highly-threatened unprotected forests comprising the Ulu Masen Ecosystem (see map). About 60% of Ulu Masen forests were zoned to be logged. Three concessions for 161,000 hectares have already been granted. The permits had been issued in earlier years, with the federal government largely controlling the process.

With the goal of obtaining carbon finance for conservation, we calculated baseline rates of deforestation for Ulu Masen based on satellite images and a review of published and unpublished literature. We estimated carbon stocks using four independent global carbon models and using the Intergovernment Panel on Climate Change's default values. We developed a tiered-monitoring system for tracking logging in real time with ultra-light planes (currently sitting at customs in Singapore—but that's another story), satellite images and ground inspections. We developed plans for a field-based carbon inventory in 2008. We developed robust risk management systems to help mitigate and manage leakage and permanence concerns. We classified Ulu Masen forests into 87 categories based on elevation, degree of disturbance, legal status and nearness to roads. We assigned conservative carbon stock estimates for all 750,000 hectares in the Ulu Masen Ecosystem.

Ready to supply REDD based carbon offsets, the next step was finding a source of finance, buyers.

Aceh Government, Fauna and Flora International and Carbon Conservation then jointly developed proposals for new regulations and zoning laws to slow down legal deforestation. We developed proposals for alternative green livelihoods, increased illegal logging patrols to make use of the data from the ultra-light planes. We proposed a new

fund to support limited community-based sustainable logging, in consultation with stakeholders through northern Aceh.

We estimated how much these measures could reduce deforestation below our deforestation

projections for Ulu Masen of around 9,000 hectares per year and found that with adequate carbon finance over the next 30 years 250,000 hectares of deforestation could be prevented. Assuming a conservative average forest carbon stock of 188 tonnes of carbon per hectare. This equates to just over 100 million tonnes of projected CO₂ emission reductions over 30 years. In the period up until the end of 2012, when the successor to the Kyoto Protocol will presumably be in place with some REDD component, the Governor's plans would avoid 16 million tonnes of CO₂ emissions.

Ready to supply REDD based carbon offsets, the next step was finding a source of finance, buyers. Aceh, with its post-Tsunami needs and ubiquitous poverty can't just turn off the logging machine. To succeed over time with community support, Aceh must turn on some forest-conserving economic engine. The ability to stop deforestation in Aceh is predicated on this poster-story for REDD actually accessing the emerging carbon market.

What our team found is peculiar, but I don't think unique to similar efforts around the world. Lots of people are talking about saving tropical forest as a way to fight climate change. They believe Governor Irwandi and his team are trying to do exemplary conservation. But no one is quite ready to invest. We pitched private investors and a venture capitalist. We got meetings with top people from E-Bay and Starbucks to name a few. JP Morgan, and other banks and other banks listened with great interest. And the response was the same: there needs to be more certainty, even for voluntary emission reductions. Everyone is waiting for something else to happen. Some want to know the rules for REDD in the Kyoto Protocol and UNFCCC process. Others are waiting for the Voluntary Carbon Standard (VCS) to publish its REDD rules. Still others are waiting for the Chicago Climate Exchange to finalize its rules for avoided deforestation. Everyone is watching the emerging domestic US climate change legislation and rule-making in California.

Collectively, even the two big REDD initiatives—the World Bank's Forest Carbon Partnership Facility (FCPF) and Australia's Global Initiative on Forests and Climate—have only announced one deal thus far. Australia announced a \$100 million deal with the Government of Indonesia and BHP Billiton in Kalimantan. The FCPF is still in early stages of development. They are making all the right sounds, but it seems Governor Irwandi is trying to move too fast to save forests.

So while the REDD topic has moved remarkably far and fast (thanks to the Coalition for Rainforest Nation's dogged diplomacy) and despite several new initiatives for saving forests to fight climate change, and despite a robust and growing voluntary market for carbon credits, our company has not been able to "show the Governor and the people of Aceh the money". We're not giving up. Next month the project proponents will invite a qualified auditor of the Climate, Community and Biodiversity Standards to assess our project design and see how we measure up to this global auditing tool for multiple-benefit projects. We're continuing to pitch the Governor's vision to anyone who will listen. And I think we will succeed. I can't imagine explaining to the Governor he is moving too fast. The carbon markets aren't quite mature enough. Investors are waiting for more rules and guidelines.

Governor Irwandi knows adversity. And still, he is upbeat, funny and determined. The people and wildlife Aceh's forests support are too important. Several new studies show Indonesia's orangutans are facing increased pressure. Other studies point to the vulnerability of Indonesia to climate change itself. The Ulu Masen Ecosystem has managed to escape massive deforestation thus far, largely due

to internal conflict and a devastating disaster. Loggers have wiped out a lot of Sumatra's forests already. They are now turning their attention to a region in need of reconstruction timber (250,000 homes were destroyed by the Tsunami). The peace process has let Aceh begin to recover and opened the door to extractive industries, looking for the next cheap cut. Will the global community step up and do something? Will the Governor's legacy be one of unrivaled green courage and heroism, or a stunning defeat while the world debated the rules for actually using carbon finance for its highest goal—helping developing country implement scaleable sustainable development while mitigating climate change? Stay tuned—the next few months are critical. I believe the Governor will, like he has done so many times, take adversity and bend it into an instrument of positive change.

John O'Niles is the Chief Science & Policy Officer at Carbon Conservation.

This article was first published on the Ecosystem Marketplace on October 25, 2007.

People: Dorjee Sun: Rockin' for REDD!

by Cameron Walker

When not raiding illegal Indonesian logging operations with the Governor of Aceh or hanging ten off the Australian coast, Dorjee Sun is cutting carbon offset deals – among them the world's largest avoided deforestation project to date. The Ecosystem Marketplace talks to one of the environmental movement's true mavericks.

It was March, 2007, and Dorjee Sun was trying to crash a party.

The CEO of carbon offset project developer Carbon Conservation, Sun had applied to get into a workshop on reduced emissions from deforestation and degradation (REDD) in Cairns, Australia, only to be turned down five times.

So he bought a plane ticket and checked himself into the Cairns Hilton.

"I sat in the lobby at the coffee store, grabbing delegates as they went to the toilet," he says.

He nabbed delegates from Costa Rica, Indonesia, and Papua New Guinea before a security guard latched onto him.

Not to be deterred, he showed up to schmooze over canapés and drinks at a conference reception.

Again, the security guards... along with the Australian delegate to the conference.

Getting Results

But this time they told the protesting Sun that he could attend the conference – if he could have a fax sent from the Australian environment minister by eight the next morning.

"7:45 AM, baby," Sun says, laughing — that's when the fax machine started whirring.

Sun's persistence — and enthusiasm — has fueled an unprecedented agreement with the Indonesian province of Aceh to protect 1.9 million-acre Ulu Masen forest, avoiding 100 million tons of CO₂ emissions over 30 years.

In February, the project was validated under the Climate, Community & Biodiversity (CCB) standards; and in April, Merrill Lynch signed a \$9 million deal with Carbon Conservation to finance it.

"As far as we know," says John-O Niles, Carbon Conservation's chief scientific officer, "this is the largest single climate mitigation project in the history of the world that's actually going to market."

Niles was an advisor to the Coalition of Rainforest Nations when he met Sun as he tried to sneak into the March, 2007, meeting.

“He said, ‘I’ve been studying this, and I want to stop deforestation this year, and I’m kind of sick of everyone just talking about it so I came to do something,’” Niles recalls.

The next day, Sun took him snorkeling, and then to dinner — a dinner at which Sun handed over his Blackberry and told Niles to contact anyone he wanted, so that he’d know how serious this party-crasher was.

Starting out in Sydney

Sun has always charged into what interests him.

After studying law and finance at the University of New South Wales, and studying Chinese and law on scholarship at Beijing University for a diploma of Asian Studies, he jumped into the dot-com boom: starting a recruitment software company, an education company, and a creative agency that focused on animation and viral marketing, among others.

Sun’s parents immigrated to Australia from near Darjeeling, India, but are of Chinese Tibetan origin and, once they’d gotten citizenship, started a small business.

“As a good migrant child, I was a student in tennis, and swimming, and all of the stuff that you do to try to be the overachieving eldest son,” he says.

Along with being the “typical” eldest son, he was infected by typical Australian outdoors obsessions — whether setting out into the bush for a day or surfing the northern beaches of Sydney.

Man on a Mission

Sun, 31, says he wanted to pair his entrepreneurial urges with something that he cared about. Each time he started up a new venture, he says, “I never felt fulfilled, and I felt that just being in front of a computer didn’t really satisfy the urges that I had. I couldn’t explain what they were. All I knew was that I wanted adventure and I wanted passion and I wanted to go out and change the world.”

“I never felt fulfilled, and I felt that just being in front of a computer didn't really satisfy the urges that I had. I couldn't explain what they were. All I knew was that I wanted adventure and I wanted passion and I wanted to go out and change the world.”

By 2006, Sun had started learning more about Kyoto and what he calls the “rabbit hole” of avoided deforestation that emerged during the 2001 Marrakesh Accord.

“Once you get into avoided deforestation and you see the insanity of the multilateral negotiations

and the total obliviousness to the science; and the deeper you dig past carbon, you get to all the amazing roles from pollination through to biodiversity the forests provide,” he says.

Surfing for Solutions

Sun kept surfing — this time on the web — to find out who was taking the lead in avoided deforestation. He tracked down a company in Lismore, Australia, and did what he always seems to do when he wants to get involved in something: he just showed up.

“Every day we lose 71,000 football fields of pristine rainforest by rapacious forestry companies which are unsustainably destroying the world.”

“I went knocking and I found this office, and there were a bunch of these ‘hippie-greenies’ that were trying to do this, and I was there in my suit,” Sun says. “And I kind of sat there until they let me buy the company.”

The Carbon Pool had been known for its Minding the Carbon Store project, which protects 12,000 acres of native Australian vegetation. Part of this project included Australia’s largest sale of verified emissions — one million tons - to mining company Rio Tinto.

While Sun calls the Rio Tinto deal “fantastic,” he wanted to up the stakes.

“Every day we lose 71,000 football fields of pristine rainforest by rapacious forestry companies which are unsustainably destroying the world,” he says. “Do you want to continue to kick around on the fringe of irrelevancy, or do you want to actually step up to the plate and make a real difference?”

With the blessing of the Carbon Pool (now under the umbrella of Carbon Conservation), he hopped on another plane—this time to Aceh, Indonesia.

Indonesia’s Forests

LeRoy Hollenbeck, an advisor to the governor of Aceh, recounts that Governor Irwandi Yusuf likes saying that only about 35 percent of the forest cover in the whole island of Sumatra is intact — and 65 percent of that is in Aceh, a province on the northern tip of Sumatra.

“That’s why we’re really keen on Aceh,” Hollenbeck says. “It has probably the largest tract of natural forest in all of Sumatra, and Irwandi is a green governor. He wants to do what can be done so that the forest doesn’t disappear. And if he can get paid for it, even better.”

In late 2006, Hollenbeck proposed the idea of linking Aceh and the province of Papua in a REDD program to the World Bank, but got nowhere. A few months later, Hollenbeck hopped a plane back to Aceh and talked with Scott Stanley of conservation organization Fauna & Flora International; Stanley told him there was a guy named Dorjee Sun in Aceh that he should meet.

In late January, 2007, the two men had dinner with Sun, and, Hollenbeck says, “The rest is history.”

For the Thirteenth Conference to the Parties of the United Nations Framework Convention on

Climate Change (COP-13) held in December in Bali, Indonesia, Carbon Conservation organized a Green Governors' Gala; here, the Indonesian governors of Aceh, Papua, Papua Barat, and Amazonas, in Brazil agreed to protect their forests and work toward developing carbon credits for voluntary markets.

Sun, whose company is working on the nuts and bolts of bringing the governors' carbon to market, says his main work is as the cheerleader of the deal.

The Ultimate Rah-Rah

"That's all I really do: I just keep rah-rah-ing," he says, although the plan did take some negotiation on his part. "I actually said to the governors, I said look, if I actually tried to get away with the behaviors [that traditional resource extraction companies have participated in], I invite you to put a spear in my chest, or in my eye, or my leg."

As of yet, he's had no close encounters with the business end of a spear. ("Despite my wide girth, I'm amazingly dexterous," the less-than-portly Sun says).

Riding Shotgun

And he seems to have found a place to use that dexterity in Aceh: riding shotgun with the governor as he performs raids on small illegal logging operations, with heavy metal band Deep Purple playing in the background.

Sun compares those chopping down forests to the Dark Side in the Star Wars series: Darth Vader, the Emperor, and their minions.

"If you imagine the economy is a runaway train, and the rules of finance and investment are just off the chain, basically, that's the evil empire," he says. "Without any type of change to fundamental infrastructure or market constructs, you don't really get the runaway train being redirected, and we'll eat our way all the way through the Earth."

On the other side are Luke Skywalker, Han Solo, and the protectors of the world's forests: "The people who choose to stand up on the [forest moon] of Endor are essentially fighting the good fight," he says. "We're far outnumbered, and far outgunned."

But while Sun talks about his work with a mixture of humor and zaniness, he's serious when it comes to protecting Indonesia's forests.

The Financial Incentive

Sun considers himself a "pragmatic conservationist," and would like to make money on the project, but if he really wanted a windfall, "holy s**t, there's a lot of other better ways to do that," he says.

"At the end of the day, we're trying to protect the rainforests forever, we're trying to alleviate [Aceh's] poverty, and provide alternative non-timber livelihoods which will result in a viable protection scheme," he says.

In Aceh, the work is going at high-speed — and perhaps a pace that isn't always comfortable. "If you look at the old phonograph records, Dorjee's probably moving at 78 speed and we're probably moving at 45 or 33 1/3," says Hollenbeck. "And there's nothing wrong with that."

Even at warp speed, Sun's enthusiasm seems contagious. "No matter who he meets, it's the same thing," Niles says. "He's usually got his rainforest ranger shirt on — a khaki short-sleeve shirt — and he goes into every meeting the same. It doesn't matter if it's the president of Starbucks or former president of the World Bank. He's like, 'High five! How you doing! Alright, here we go! Are you with me?'"

The Merrill Lynch Deal

One of Sun's full-speed-ahead efforts has been finding investors for the project.

He began pursuing Merrill Lynch last year, and the company's managing director and global head of carbon emissions, Abyd Karmali, started working with Sun once they focused in on the Aceh project in October 2007.

"I've never chased a girl as hard and as fast as I have Abyd Karmali," Sun says.

Interest in the Aceh project was mutual, Karmali says. Merrill Lynch then did its own assessment of the proposed program, meeting with the governor, local NGOs and others involved.

"Merrill Lynch wanted to be an early mover in the forestry carbon area." The deal was an excellent fit with Merrill Lynch's new Environmental Sustainability Framework and a company green initiative, Karmali says, and along with the commercial potential, the project could help shape REDD policy. "And then of course, Dorjee himself is someone who was able to represent his project very eloquently, and was able to transmit the broader vision that the governor of Aceh had for his region."

Karmali says the deal is structured in such a way that the project itself will benefit, along with its investors. And while, as a first-of-its kind project that carries risks, he says, "the potential for this project is very significant, because if we can achieve greater sales, then that's obviously going to deliver far more than \$9 million in terms of value to the actual project."

"When Merrill Lynch stepped forward and put their name to this, it wasn't just the money; it was the fact that an investment bank, for the first time was deploying its money, thinking they're going to make more money by helping us save (the forest) than they are by helping us tearing it down," Niles says.

Merrill Lynch's participation is groundbreaking, Sun says, because instead of investing philanthropic or conservation money in the deal, they're pulling money from their commodities trading fund.

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make more money by helping us save (the forest) than they are by helping us tearing it down," Niles says.

Sharing the Risk

Sun has taken on much of the uncertainty himself.

While there are many who talk about doing projects like this, Sun has actually poured his own money into his work, a step many haven't taken, says Martijn Wilder, a partner at the Sydney office of Baker & McKenzie, a law firm that advises Carbon Conservation.

"He's put everything he has at risk," Wilder says. "You've got to credit him with that."

Next Steps

One of Sun's goals is to turn Aceh into an exemplary project to show off at the COP 15 conference to be held in Copenhagen at the end of 2009. Early reports indicate that Aceh's forests are already improving: Niles says trails that were logging roads a year and a half ago are overgrown, and this summer they'll conduct remote sensing surveys and calculate the actual emissions reductions accomplished.

Meanwhile, Sun's company is lobbying for emerging carbon markets to include the project's carbon credits, and working on convincing other financial institutions that this project is only the beginning in terms of where carbon markets — and projects — could go.

"We're easing people into what could eventually turn out to be a significant market," he says. "They just have to change their valuations from short term finance to long-term total economic value."

And Sun has a lot more he wants to bring to the table. Having worked in the fashion industry, he compares labels like Ralph Lauren and Tommy Hilfiger — which he says promote an image without meaning — to the plans he has for creating a global "brand" based on protecting forests.

"I haven't started really using my marketing," he says. "I haven't started really using my viral stuff, but I will absolutely tie it together for one campaign, and it's the campaign that I think is going to pretty much cover the rest of my life, and that's going to be the appropriate valuation and protection of the most important resource in the world, which is our only home."

Cameron Walker is a freelance writer and a regular contributor to Ecosystem Marketplace.

This story was first published on the Ecosystem Marketplace on June 20, 2008.

Places: Restoring Prairie Potholes

by Eric Ness

Ducks Unlimited has restored more than ten million acres of natural habitat, creating carbon sinks that capture untold millions of tons of carbon every year. The Ecosystem Marketplace examines DU's latest effort to harvest those carbon credits and perhaps blend them with biodiversity offsets to restore one of North America's most important and endangered bird habitats — and with it a peculiar geological legacy of the Ice Age.

Adolph Feyereisen thought he knew all the ways to farm his 1040 acres in Emmons County, North Dakota. He'd taken over a dairy operation from his father in the 1960s, ran that until 1975, and then raised beef for a decade before dropping that to become a crop adjuster. Now that he's semi-retired, he's back to beef, along with small grains like barley and wheat.

But his latest cash crop is novel to the agricultural economy of the plains: sequestered carbon.

Last January, conservation group Ducks Unlimited purchased both a perpetual easement on Feyereisen's native grassland and the rights to the carbon stored under that 272 acres. DU then passed the easement along to the Fish & Wildlife Service, but is bundling Feyereisen's carbon with the carbon from scores of other North Dakota landholders and selling it on the open market, perhaps to a corporation in search of a significant carbon offset.

The short-term plan is to invest the proceeds from the carbon market in new habitat protection in the plains states. Then, if that works out, DU could take its 11.5-million-acre track record of habitat restoration and turn it into a revenue-generating portfolio to accelerate its conservation work.

For some of the most important and threatened waterfowl habitat in North America, the plan comes just in time.

The Brokers

"These are some of the best credits I've ever seen or been a part of," says Radha Kuppalli of New Forests, a Sydney-based company helping to broker the deal.

Better known for forest management, New Forests is working with Equator Environmental, LLC to package the DU carbon for the voluntary carbon market. Equator provides financing to help fund carbon purchases, and will sell the credits to investors looking to downsize their carbon footprint. Equator and New Forests will work together to ensure that the credits meet high standards.

"Every single element that you can think of in a carbon project — additionality, quantification

protocols, leakage, permanence — everything that you need to address is here,” says Kuppalli. “There is such an enormous biodiversity component.”

To Farm or Not to Farm

That’s precisely DU’s interest. Feyereisen’s 272 acres is native prairie, never tilled because it’s quite rocky and hilly. It’s also pocked with glacial potholes — shallow, watery depressions left by the glaciers. He’s never planned to plow it, but that doesn’t mean it can’t be done.

“They just have to rip the rock out,” says Feyereisen. “The equipment they’ve got now, it doesn’t take much. To say land can’t be farmed in this day and age, the way technology is going, that’s probably a pretty far-fetched statement.”

Abundance of Birds

Before the advent of European settlers, the Prairie Pothole Region in the Dakotas was at the heart of the world’s largest grassland, the Great Plains of North America. Feyereisen’s potholes are just a few of the millions of glacial potholes that cover some 100,000 square miles, harboring rich stores of aquatic plants and animals. Pintails, mallards, gadwall, blue-winged teal, shovelers, canvasbacks—each spring millions of ducks nest in the grasslands adjoining the potholes. Many other birds—lesser scaup, wigeon, green-winged teal, Canada geese and snow geese—use the area as a staging ground in their migration to the boreal north.

These fowl riches brought DU to the region almost at its inception, beginning habitat restoration in the adjacent Canadian portion as early as 1938. Since then, the organization has done restoration work on 11.5 million acres throughout much of the United States. But the potholes remain a priority: DU considers the area the most important and threatened waterfowl habitat in North America. Agriculture has already destroyed or altered more than half of the potholes. And climate change is the new threat on the horizon; the Wildlife Society projects a loss of as much as 90% of U.S. wetlands by 2080.

Competing Interests

Meanwhile, agricultural pressures are building. Ironically, climate concern has helped heat up the biofuels sector, putting further

pressure on food prices that were already being ratcheted up by rising petroleum prices and natural disasters. Vagaries in federal agricultural policy are also having an impact. The Conservation Reserve Program (CRP), which rewards farmers for converting highly erodible cropland to grass, has been unable to compete with the hot ag land market as the 10 to 15 year contracts have expired. Almost 420,000 acres of North Dakota CRP land — more than 12 percent of the state’s total — were lost back to cropland in 2007 alone.

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Federal ability to do conservation work in North Dakota is abridged as well; a political backlash against federal lands resulted in legislative veto power over the expenditure of federal duck stamp

money to purchase habitat in the state. That leaves the private sector.

“Wildlife belongs to the public, yet private property – and therefore private landowners – really have all the habitat, so you have to work with them,” explains Jim Ringelman, DU’s Director of Conservation Programs for the Dakotas and Montana. DU has been working with private landowners for decades, developing tools and credibility.

Underground Carbon

Its carbon work began a couple of years ago, as the voluntary carbon market was beginning to solidify. While the carbon storage potential of forests rises in plain site, grasslands hide their carbon underground. Prairie plants sink deep roots five to nine feet into the plains, stockpiling carbon away from the oxidizing forces that would release it into the atmosphere. The Agricultural Research Service already had some local data on sequestration potential. With support from the Plains CO₂ Reduction (PCOR) Partnership, DU worked with soil scientist Larry Cihacek of North Dakota State University to measure carbon stores under native prairies and restored grasslands.

It was an ideal research situation: Grasslands restored under the conservation reserve program range in age from a couple of years to 20 years.

It was an ideal research situation: Grasslands restored under the conservation reserve program range in age from a couple of years to 20 years.

“We could sample in one or two years a huge range of vintages,” explains Ringelman.

DU research shows that the north plains grassland sequester an average of 1.485 tons* of CO₂ equivalent per acre per year. And while forest types in DU’s restoration portfolio can put away three to six times that, the acreage of the grassland resource is large enough to make it a potentially major player.

Adding Above and Below

Enter the US Fish & Wildlife Service, whose Grassland Easement program operates in the Prairie Pothole Region with a short budget and a backlog of interested participants. DU’s plan is to buy perpetual grassland easements and carbon credits at the same time. The easements are passed on to the FWS, and the carbon credits are bundled and resold to finance more conservation.

“It keeps the land in the private landowners’ hands,” explains Tammy Fairbanks of the FWS. “It doesn’t change their use on the property. They can still graze it, hay it, and get an income off it, and they pay taxes on it. The government does not have an operation and maintenance cost on that property. So we have the habitat protection, but we don’t have the cost of managing it.”

The DU assistance also cuts down on the FWS backlog, protecting habitat in imminent danger—the pothole counties of North Dakota alone have lost 88,000 acres of native prairie since 2002.

Meager Resources

“We need resources in the order of many tens of millions if not hundreds of millions to do what we need to get done,” adds Ringelman. “We have no hope of getting that through the traditional sources – the duck stamp money. This is big potential for us to accelerate our work. It’s revenue of the order of magnitude that we think is necessary to really make the kind of conservation footprint that we need to have to save the critical habitats. And it comes at an ideal time because current crop prices are putting a whole new set of pressures on grasslands.”

All the Ingredients

A number of elements make the DU plan exciting, beginning with the federal foundation.

“Having a perpetual easement held and monitored and enforced by the US Fish and Wildlife Service is extremely valuable,” says Kuppalli. “You’ve got the federal government backing your product. It’s really enabling. If you’re investing in carbon, or you’re a carbon buyer, you have to choose between a perpetual easement helped by a lands trust versus one held by the federal government?”

But while a federal program enables the project, Kuppalli is also quick to point out that federal programs and subsidies for corn and other commodities create countervailing forces.

The private element is important too, argues Dick Kempka, who spent years developing GIS technology for DU before jumping recently to Equator as vice president of sales.

“Seventy percent of the opportunity in the ecological asset market will be on private land,” he says. “If you can’t work on private land, you’re probably not going to be a big player in this arena.”

Incorporating grassland into the voluntary carbon market is another coup.

“Whatever business you’re in, you want to have a diversified portfolio,” he says. “There is a lot of benefit to restoring grassland and having tonnage be available right away, in a market where most feel there will be an annualized accounting.”

Then there is the Ducks Unlimited brand.

“That’s the big selling point,” he argues. “The social benefits associated with offsets are much better than any type of geologic sequestration, or methane capture. The bottom line is if I’m a pre-compliant utility, or a carbon-neutral socially responsible type of investor, these types of offsets very much fit the bill because they’re going to get other benefits from it – whether they’re explicit or implicit.”

Rethinking Agricultural Value

Ringelman hopes to change the very definition of agricultural value in the plains.

“There is a notion here that we have to pump up the economy of the state, and that grassland - particularly native prairie - is just a land cover that’s waiting for a higher and better use to come

along,” he says. “Now we have a chance through this carbon work to show them that look, there’s more to this land. It’s more than just cutting hay and running cows on it. You’re also sequestering carbon. You’re doing a lot of things that people are going to start paying for, so let’s hold on to this here and take another look at it.”

DU plans to keep pushing the ecosystem services envelope, looking at water quality and possibly biodiversity offsets as well.

Exploring Biodiversity Offsets

“What we do with restoring wetlands has big water quality benefits. I think that’s not very far off,” says Ringelman. “Biodiversity is a little bit funkier.”

Funky, but not far-fetched. Birds traverse North America from key breeding areas like the prairie pothole to wintering areas. And populations are often limited by what happens on the breeding grounds. The Henslow’s sparrow, for example, breeds in the plains grasslands, but winters to the south, often in populated coastal areas.

“Maybe the time’s not far off that when someone does a project that’s affecting wintering habitat and sparrows down there, they’ll be coming to us (because) we can really have a population affect working with on this end of the flyway,” says Ringelman.

Feyereisen thinks a little more down to earth.

“My kids are willing to leave it like it is, and I would hope it would be like it is,” he says. “If I want to be selfish about it, this is one way to make sure it is.”

Erik Ness writes about science and the environment from Madison, Wisconsin.

This story was first published by Ecosystem Marketplace on June 28, 2008.

Opinion: Sierra Gorda Taps Voluntary Markets for Carbon and Environmental Offsets—Again

by Jim Whitestone

The Grupo Ecológico, which has co-management responsibilities with the Mexican government for the Sierra Gorda Biosphere Reserve in central Mexico, is looking to help finance its ambitious biodiversity conservation program for the reserve by selling carbon and environmental offsets. Bosque Sustentable A.C., which GESG created to implement its strategy of combining resource protection with sustainable use, will be the actual provider of these offsets.

Voluntary markets offered Grupo Ecológico and Bosque Sustentable advantages associated with innovation, vibrancy and accessibility, and they seized the opportunity. Bosque Sustentable completed its first sale in the voluntary market in 2006 to the United Nations Foundation, which wanted to offset its carbon footprint as well as support a UN-sponsored project that also helped alleviate poverty. Bosque Sustentable is now in the final stages of concluding a second sale with the United Nations Foundation as well as a sale to the World Land Trust, based in the U.K. The World Land Trust will be selling Sierra Gorda Carbon and Environmental Offsets to a range of voluntary European buyers who are interested in biodiversity and poverty reduction benefits in addition to carbon sequestration.

Sierra Gorda Gourmet Carbon/Integrated Offsets

These sales highlight a principal advantage of voluntary markets in relation to regulatory markets in allowing Bosque Sustentable to access buyers that are interested in more than just carbon

sequestration, an advantage that it is well positioned to exploit. Martha “Pati” Ruiz Corzo, the director of the Sierra Gorda Biosphere Reserve, has described the voluntary credit as “not just a carbon credit, but a green jewel protected by its inhabitants.”

“Not just a carbon credit, but a green jewel protected by its inhabitants.”

In addition to carbon sequestration, their activities in the areas of reforestation, avoided deforestation and the inducement of natural forest regeneration can help to safeguard biodiversity while preserving hydrological functioning, avoiding erosion and providing other ecosystem services. Specifically, Bosque Sustentable’s work in forest restoration helps sequester carbon while planting on steep slopes maximizes benefits associated with protection of important hydrological

recharge areas, reduced soil erosion and accumulation of large forested areas for biodiversity enhancement. Payments and training to small landholders to establish tree plantations encourage sustainable harvesting while also reducing poverty.

Grupo Ecológico and Bosque Sustentable are not about to downplay the fact that trees in the Sierra Gorda absorb CO₂ as they grow since carbon sequestration continues to be the driver of these markets. However, they seem to be tapping into a niche of buyers who are interested in other benefits as well as addressing climate change. In addition to offsetting their carbon footprint, individuals, businesses and organizations are increasingly interested in safeguarding biodiversity as well as providing sustainable livelihoods to avoid the root causes of deforestation. In the Sierra Gorda, the projects are designed taking into account local forest values and the needs of the forest owners and are implemented by local organizations with knowledge of the local physical and social conditions.

High-Quality Verified Offsets

While GESG and Bosque Sustentable decided to pursue voluntary markets viable for areas of poverty instead of formal regulated markets due to the very costly and complex process for certifying CDM credits, sales in the voluntary carbon market have not come at the expense of quality and verifiable credits. This has been a very important consideration in the sales of Sierra Gorda offsets concluded so far. The two organizations have directed significant attention and resources at documenting the effectiveness of Sierra Gorda Offsets in terms of carbon sequestration, biodiversity preservation, hydrological services and improving the livelihoods of people in the local communities.

These are being verified through ongoing scientific assessments and social return on investment analyses. The University of Monterrey is measuring the amount of carbon being stored in the various species and ecosystems of the Sierra Gorda while inventories are also underway of the various flora and fauna including jaguar in the reserve. Scientists at the University of Queretaro are using data, in combination with information concerning land cover and soil type, to model improvements to hydrological processes throughout the Reserve resulting from reforestation and soil conservation measures. Grupo Ecológico Sierra Gorda has also undertaken a Social Return on Investment Analysis to assess the range of impacts of their programs on the communities in the Sierra Gorda.

Pursuing verification of offsets is especially important at this time when there has been rapid growth in the global market in carbon trading which tripled last year to \$30bn. At the same time, the World Bank has raised concerns about the effectiveness of unregulated carbon offset projects. If the carbon market loses credibility, carbon offsets would no longer be available to provide a useful tool for reducing emissions and as a cost control mechanism for companies in countries with carbon caps.

The Road Ahead

In addition to the recent agreements with the United Nations Foundation and the World Land Trust, Grupo Ecológico and Bosque Sustentable will be pursuing other marketing channels for their integrated offsets including directly through their own website: www.sierragorda.net/carbon/index.htm. They anticipate

They anticipate that Sierra Gorda Carbon and Environmental Offsets will be increasingly in demand.

that Sierra Gorda Carbon and Environmental Offsets will be increasingly in demand as: more and more individuals, businesses and organizations come to understand the business case for sustainable development; as consumers increasingly demand more environment friendly products; governments need to respond (through new regulations if needed) to pressing environmental problems like climate change, water shortages, pollution and loss of biodiversity; the financial community seeks greater assurances from companies in demonstrating their ability to manage environmental risks; and companies compete to attract and retain skilled workers who want to identify with corporate values.

Sierra Gorda Offsets can offer an important tool to individuals, businesses and organizations globally as well as locally in Mexico in meeting these higher business standards for sustainability. This is especially true at this time when there is an effort to get Mexico as well as Brazil, China, India and South Africa to join with the G8 countries (“G8 plus five”), which combined account for 75 per cent of the world’s greenhouse-gas emissions, to craft a climate-change plan to succeed the Kyoto Accord.

In many cases, voluntary markets at the very least can play a complementary role to regulated markets if not to serve as forerunners in the transition to regulated markets such as in the case of formal cap and trade systems for carbon markets. In engaging in voluntary markets, conservation organizations can play an essential role in reducing transactions costs and driving innovation, something that Martha “Pati” Ruiz Corzo, the Grupo Ecológico Sierra Gorda and Bosque Sustentable have never shied away from.

Jim Whitestone is an Agricultural and Resource Economist with the Ontario Provincial Government, who participated in a professional exchange with Grupo Ecológico Sierra Gorda sponsored by the Inter-American Institute for Cooperation on Agriculture (IICA) - Canada, a specialized agency of the Organization of American States (OAS).

This article was first published on the Ecosystem Marketplace on October 16, 2007

Place: Mbaracayú: Lessons in Avoiding Deforestation

by Steve Zwick

Six years before the Kyoto Protocol was drawn up, North American energy provider Applied Energy Services (AES) paid \$2 million to offset roughly 47 million tons of CO₂ by helping to fund the Mbaracayú Forest Nature Reserve (MFNS) in Paraguay. It was 1991, and the debate over forestry credits was foggy to say the least.

Indeed, few outside of a tiny circle of forward-thinking academics and activists had truly pondered how to quantify the amount of carbon captured in trees, let alone how to measure the impact of sustainable forestry on indigenous people. MFNS organizers, however, managed to create a 64,000 hectare private reserve, the benefits of which flow out to a 300,000-hectare buffer zone of sustainable agriculture. The indigenous Aché people have taken an active role in managing the reserve, and smaller private reserves are sprouting like mushrooms in the buffer zone to create migration corridors in support of a UNESCO-recognized biosphere reserve.

Getting Started

The Mbaracayú region is one of last remnants of the traditional Aché hunting ground, over which they'd been losing control for decades before finally being dispatched to reservations in the 1970s. Mbaracayú then passed to an Argentinean logging group called FINAP, and finally ended up in the hands of the World Bank after FINAP defaulted on a loan.

North American anthropologist Kim Hill then began lobbying the World Bank to give the land to the Aché, but it remained in limbo for years, and by 1987 seemed destined to be divided up and auctioned off to soybean farmers for \$7 million.

That's when Hill teamed up with Raul Gauto, who was heading the Paraguayan Ministry of Agriculture's Conservation Data Center and working with The Nature Conservancy (TNC) to build a biodiversity data base. Gauto and Hill asked TNC for advice on turning the area into a forest reserve with special use rights for the Aché, and Gauto quickly carried out a comprehensive biodiversity survey of the property to help them make their case.

"With the help of a multidisciplinary team made up of 13 professionals, and over a two-week period, we tried to collect all the biological and physical data to support our next move," says Gauto. "This was to try to persuade the World Bank to donate the land to us."

But they continued to pursue other routes. Gauto had heard about AES after the company funded a

pioneering forestry project in Guatemala. Through TNC, he was able to get word of the situation in Mbaracayú to AES owner Roger Sant. At the same time, he persuaded twelve Paraguayan businessmen to create a non-profit organization called Fundacion Moises Bertoni (FMB) to lobby the government on behalf of the Aché.

These efforts yielded fruit after the fall of notorious Paraguayan strongman Alfredo Strössner in 1989, and the Paraguayan government passed a law making the reserve possible and promising land near the reserve would be transferred to the Aché, in accordance with a 1989 United Nations convention on the rights of indigenous people. The World Bank, however, continued to balk at donating the land.

But they did lower their price to \$5 million, at which point FMB offered \$2 million and was given the property – on the condition that it would not be grabbed by the government and that indigenous people would play an active role in managing it.

Structuring the Deal

The two NGOs quickly secured donations to cover the purchase price, with a smattering of miscellaneous small donors (including members of the rock band REM) chipping in a total of \$250,000. AES and USAID contributed \$500,000 each, and one very generous anonymous nature lover from Ohio came up with \$750,000.

But that was just the beginning, recalls Yan Speranza, who took over from Guato as head of FMB in 2001. “The only reason this program is so successful is because we can think in the long term,” he says. “And we can think long-term because we have a trust fund.” That trust fund is where the bulk of the carbon offsets come in.

As the deal was coming together, AES was looking to offset 35 years of emissions from a new power plant it was building in Hawaii. The company calculated that the plant would emit 13.1 million metric tons of carbon over the ensuing 35 years—or about 47 million tons of CO₂ using the generally accepted conversion factor of 3.6:1. They offered to pay just over 15 cents for each ton of carbon sequestered—or about 4 cents per ton of CO₂, roughly \$2 million in total, with \$500,000 going to the purchase of the land, and \$1.5 million establishing the trust fund used to maintain the property.

The reserve is managed from the proceeds of the trust fund, and the principle is off-limits. “We basically reinvest everything we can,” says Speranza. “It’s now grown to \$6 million.”

Getting the money, however, required not only measuring the amount of carbon in the trees, but proving to AES that the forest would not survive without the funding—what today we call the “additionality” requirement.

“That was easy in this case—because the forest was earmarked for destruction,” says Speranza. “These days, the difficulty would be in quantifying the non-carbon benefits—biodiversity, culture, and so on. Back then, the biggest challenge was measuring the carbon.”

Guato tapped the forestry faculty of the National University and the staff of the National Forest

Service to measure the amount of carbon sequestered in the trees. The study involved first identifying three different types of forest using satellite imagery, and then measuring the diameter of all trees thicker than ten centimeters at chest height in fifteen plots within these three forest types, and then extrapolating the total carbon in each tree based on that data. Then they assigned a biomass per hectare amount for each forest type, and used the satellite images to come up with a total number.

“We came up with 27 million metric tons—about twice what we needed,” says Speranza. “We then sent our study to people at other universities, like Sandra Brown from the University of Illinois (now at Winrock International), who said the methodology was legitimate. Ultimately, AES agreed the numbers were good.”

Although the reserve is obligated to send yearly reports to AES, FMB has not commissioned another carbon inventory since the project launched. “The 64,000 hectares are intact, so we know the amount has not gone down,” says Speranza – adding that another inventory is in the works.

How to Spend It

“At first, we only had 57,700 hectares,” says Speranza. “The other 6,000 hectares came over the next few years – but 57,700 is still a lot of territory to protect from danger.” FMB found that illegal logging had been taking place around the edges of the reserve, and went about recruiting and training forest rangers.

“There are 17 public reserves in Paraguay, covering about five million hectares,” he says. “The biggest one is about 700,000 hectares, and only has two park rangers. We, in contrast, have 64,000 hectares and 18 park rangers – as well as modern communication systems, on-going training, and so on—all because of the trust fund.”

He also rattles off a litany of social benefits generated by the reserve. “We never thought only about conservation, but also about how to promote sustainable development for the whole region,” he says. “We’re really proud of this, because up until the mid-90s, conservation projects usually focused only on protection of nature, and not on the surrounding areas or communities.” See a (detailed examination of the project’s social benefits through the year 2000 — PDF)

FMB has been working with private land owners in the surrounding 300 hectare buffer zone since the reserve’s inception. “The problem in Paraguay isn’t just deforestation, but fragmentation,” he says. “We helped draft the legislation that offers tax incentives for private reserves, and now we’re working with private land-owners to get them to create private reserves so that we can have migration corridors.”

Four private reserves have already been created, and FMB hopes to see between 80,000 and 100,000 hectares of the buffer zone eventually covered in reserves. In 2001, the United Nations Educational, Scientific and Cultural Organization (UNESCO) recognized the surrounding area as the Bosque Mbaracayú Biosphere Reserve, which has made it possible for FMB to secure more funding from grants.

The group has also promoted sustainable agriculture within the buffer zone, and introduced crops such as sesame into the area. Speranza says he can document a quadrupling of income over the past five years, and believes much of this flows from FMB's social efforts—which include the funding of schools and a health center, as well as communications infrastructure.

Green Business

Speranza says that the trust fund has given FMB a chance to prove its financial competence, and three years ago became the first NGO in Paraguay to receive a grant directly from the World Bank's Global Environmental Facility. They've since leveraged their good reputation to secure loans and grants to get into for-profit green businesses.

"About 22% of our income comes from the for-profit companies, and 45% from the trust fund," he says. "The rest comes from service fees and grants – but we are getting less and less from grants, and that is our goal."

Seven years ago, for example, FMB purchased LICAN, a meat processing plant that had been dumping blood from slaughtered animals into a local river. "We discovered that you can use the blood to make plasma and hemoglobin, which is a raw material for animal feed," he says. "By using the blood this way instead of dumping it to the river, and running this company with a triple bottom line, we are generating environmental, social and economic value: the blood does not go the river anymore, people who were suffering along river no longer are, and the company is profitable, helping us to finance—through dividends received—all our other activities. Truly a virtuous circle."

They recently identified a similar meat packing plant in Chile, and together with a Chilean partner formed a joint venture to purchase and manage the property in a sustainable way. As shareholders, FMB receives dividends from the partnership.

"About 22% of our income comes from the for-profit companies, and 45% from the trust fund," he says. "The rest comes from service fees and grants – but we are getting less and less from grants, and that is our goal."

Controversially, FMB recently agreed to a ten-year strategic alliance with soybean growers interested in developing a management model also based in a triple bottom line. Speranza says the project creates both social and environmental value because FMB is helping neighboring communities create private reserves inside their properties, but he fears some will accuse him of making a pact with the devil.

"Soybean growers are blamed for deforestation, so this is bound to give us some problems," he says. "Our feeling, however, is that you have to work with the private sector to develop agriculture in a good and sustainable way. We know how to work with local communities, and we know how to create reserves and deal with environmental issues, so it is part of our mission to share this know-how."

Ache: Unfinished Business

The law establishing the reserve gave the Aché exclusive rights to hunt on the reserve, and they also have seats on the reserve's advisory board, but Hill says they're still being short-changed.

"While the Aché were given use rights by the 1991 law creating the reserve, they have not been titled any additional land surrounding the reserve, the area that encompasses their traditional homeland," he says. "The Aché gave up the Mbaracayú Reserve area because they were promised another piece of land, but so far, after 16 years, they still have no land title."

And that's hardly a minor issue. One of the key selling points of avoided deforestation projects is that they will help indigenous people and small landowners—in part by forcing more clarity on land tenure. Critics say that clarity may come at the expense of the indigenous people such projects purport to help.

These issues are sure to gain prominence in the year ahead as we explore the efficacy of the new Climate, Culture, and Biodiversity (CCB) standards—the success of which will largely hinge on their resolution.

Next in this series: we revisit a late 1990s project in Brazil, the Guaraqueçaba Climate Action Project, and examine the impact of standardized methodologies on projects in the works today

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This article was first published on the Ecosystem Marketplace on January 8, 2008.