

Forests:

Taking Root in the Voluntary Carbon Markets, Second Edition



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Introduction

Over the past two years, 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 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 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 Brazil Katoomba conference, held in Mato Grosso, Brazil, April 1-2 2009. The conference is the fourteenth 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

December 2006 | 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 Katrina 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).

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 €0.02 up to €2.85. Polluters

Figure 1.1 The greenhouse effect



Source: Pew Center on Global Climate Change. (2001) ‘The greenhouse effect,’ in Claussen, E. et al (ed) *Climate Change: Science, Strategies and Solutions*. Boston, MA: Brill Academic Publishers

suddenly must consider a new suite of options: do they accept the cost of added pollution, change fuel mixes or simply conserve energy?

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.

Carbon 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 permits (also known as 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. Likewise, participants who exceed their required levels can purchase extra allowances from participants who outperformed their emissions targets.

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).

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

Box 1.2 The Chicago Climate Exchange (CCX)

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.

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.

Compliance Carbon Markets

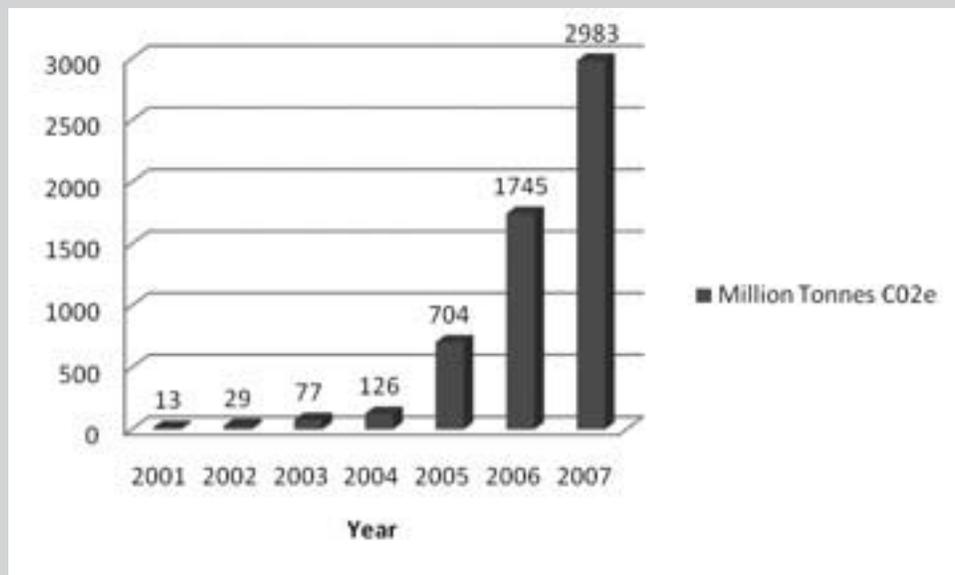
There are now a number of regulated cap-and-trade carbon markets around the world. The Kyoto Protocol underpins in one way or another most of these markets. Ratified by 182 countries, the Protocol is a legally binding treaty committing industrialized countries to reduce their collective GHGs by 5.4 per 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.

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).

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 €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.

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 € to €2 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 (€7 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

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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.

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.

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 (€64 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).

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).

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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. 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 (Krolik, 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. 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.

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

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 1.2 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	1st validated 2006, 1st 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	1st 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
Green-house 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	1st 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	No	Creating its own registry system	Reforestation & Avoided deforestation	South America & Portugal	1st 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

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).

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 by Earthscan in spring 2009)*

Forging a Frontier: State of the Voluntary Carbon Markets 2008 Executive Summary

A Report by Ecosystem Marketplace & New Carbon Finance

By Katherine Hamilton, Milo Sjardin, Thomas Marcello, and Gordon Xu

Executive Summary

May 2008 | Over the past two years, numerous writers and analysts have likened the voluntary carbon markets to the “wild west.” In 2007 market trends highlight that this frontier has become a settlement zone. Customers are increasingly savvy about the opportunities and pitfalls in the carbon offset domain and stakeholders are aggressively working to forge the rules of the game and structures to enable smooth transactions.

While interest in carbon offsets and, in turn, the growth of the voluntary carbon markets has accelerated dramatically, quantitative data regarding these markets has been sorely lacking. With the goal of filling a significant information gap, last year Ecosystem Marketplace and New Carbon Finance teamed up to undertake a comprehensive, quantitative analysis of the voluntary carbon markets. The result was our first annual *State of the Voluntary Carbon Markets 2007*. The report answered fundamental questions about the size, players, project types, prices, and transaction volumes of the voluntary markets.

The answers to these questions are becoming increasingly important to market actors ranging from community land owners in the developing world to bankers and carbon traders in the world's financial capitals. While the voluntary carbon markets may not be as large or profitable as their regulated brethren, voluntary markets have proven themselves to be innovative, nimble—and controversial. These often misunderstood voluntary carbon markets represent consumer demand for action on climate change and have the potential to be an immediate resource as the international community struggles to implement a fully effective climate change framework. In addition, in some cases they're even setting the stage for future developments in the regulated markets (e.g. voluntary markets have been transacting deals in avoided deforestation since before 1990, while the Kyoto carbon markets are just now beginning to consider how they may eventually deal with the issue of avoided deforestation).

To understand how the voluntary carbon markets work, and how this report is structured, it is critical to know that the voluntary carbon markets can be divided into two distinct components: the Chicago Climate Exchange (CCX) and a more disaggregated over-the-counter (OTC) market. CCX is a structured and closely monitored cap-and-trade system that organizations join voluntarily. Outside of CCX, one finds a wide range of voluntary transactions that are not driven by an emissions cap, and do not, for the most part, trade on a formal exchange. Throughout the report we refer to this mass of transactions as the over-the-counter (OTC) market. Because this OTC market transacts on a highly fragmented deal-by-deal basis, it is extremely difficult for stakeholders to both track and navigate. It is for this reason that Ecosystem Marketplace and New Carbon Finance have invested considerable resources in conducting this market-wide quantitative survey and analysis of the OTC market.

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This second annual report, *Forging a Frontier: State of the Voluntary Carbon Markets 2008*, is based on transaction data collected from 150 organizations, including project developers, wholesalers, brokers and retailers, selling carbon credits to voluntary buyers. It also includes transaction data gleaned from several carbon credit registries in the OTC market.

Gold Rush? Volumes and Values

This year we tracked **42.1 million tonnes** of carbon dioxide equivalent (MtCO₂e) transacted on the OTC market in 2007. Combined with the **22.9 MtCO₂e** transacted on the CCX in 2007, we were able to confirm a total volume of **65.0 MtCO₂e** transacted in the voluntary carbon market in 2007. Relative to the volumes observed in 2006, this represents a tripling of transactions for the OTC market, from the 14.3 MtCO₂e traded in 2006, and more than doubling of volumes on the CCX. Since this report is fully based only on completed and confirmed transactions, these volumes should be considered conservative. In other words, the actual volume of credits transacted in the voluntary market is without a doubt higher than this amount.

Of the 42.1 MtCO₂e of credits traded on the OTC market in 2007, respondents were only able to confirm that **10.7 MtCO₂e** were directly destined for retirement. According to this number, 25% of the total traded

Transaction Volumes and Values, 2006 and 2007

Markets	Volume (MtCO ₂ e)		Value (US\$million)	
	2006	2007	2006	2007
Voluntary OTC Market	14.3	42.1	58.5	258.4
CCX	10.3	22.9	38.3	72.4
Total Voluntary Markets	24.6	65.0	96.7	330.8
EU ETS	1,104	2,061	24,436	50,097
Primary CDM	537	551	5,804	7,426
Secondary CDM	25	240	445	5,451
Joint Implementation	16	41	141	499
New South Wales	20	25	225	224
Total Regulated Markets	1,642	2,918	31,051	63,697
Total Global Market	1,667	2,983	31,148	64,028

Source: Ecosystem Marketplace, New Carbon Finance, World Bank

Last year we accounted for 13.4 MtCO₂e transacted on the OTC market in 2006. Because we were able to gather information from additional suppliers this year, we've now accounted for 14.3 MtCO₂e transacted on the OTC market in 2006.

Origin of an Offset

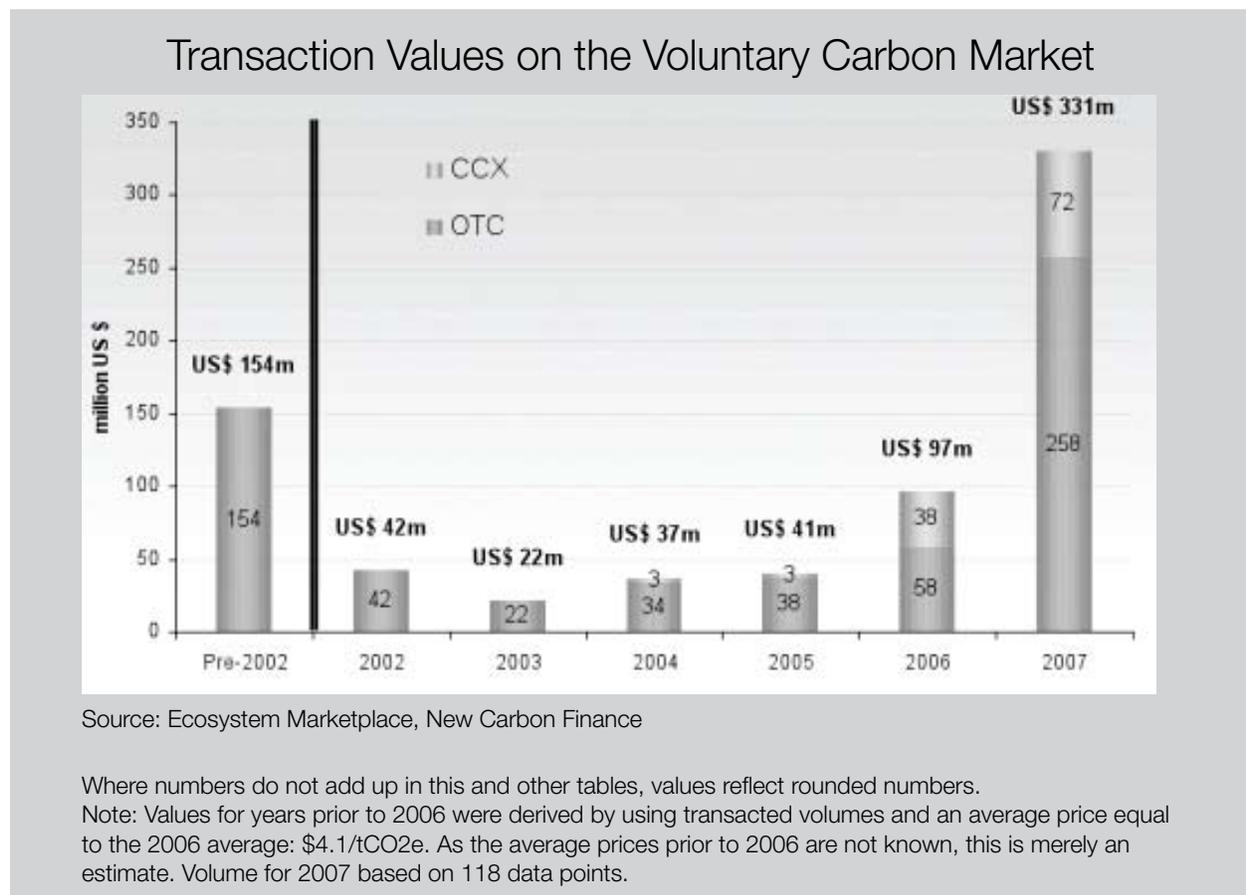
The sources of offset credits in the voluntary markets are extremely diverse, with numerous project types holding important slices of market share. In the OTC market, renewable energy (31%), energy efficiency (18%), and methane destruction (16%), and forestry land based projects (18%) were the most dominant project types in 2007. This is somewhat different to 2006 when the top three project types were forestry (37%), renewable energy (32%), and industrial gas projects (20%). The biggest difference is a significant decline in renewable energy projects sold. The decline in popularity of industrial gas projects reflects the consumer demand for project types with sustainability benefits attributes, which HFC projects are lacking. Generally, OTC market consumers are orientating to less-controversial and “charismatic” project types that have public appeal. However, not all OTC market consumers are driven by these motivations. As noted above, some companies (representing 29% of the volume supplied in 2007), particularly those in the United States, are also investing in carbon offsets with the hope of potentially selling them, for compliance purposes.

For the CCX, we were only able to obtain data for project type and location of offset credits for credits issued to date, rather than those actually sold in 2007. The CCX, between its launch in 2003 and December 2007 issued the most credits from soil carbon (46%), coal mine methane (30%), and landfill methane (9%) and therefore represents a significantly different project type breakdown than the OTC market. Because carbon credits are more commoditized on the CCX the ‘story behind the credit’ is generally less relevant on the exchange.

volume was used to directly offset emissions and was not sold as a resale investment. The remaining 75% of the volume merely changed hands and could be resold in the future. However, because a significant percentage of sales brokers or suppliers could not confirm whether credits were retired, this number should be considered conservative. It is likely that in practice, more transactions ended in retirement. For example, by looking at the type of buyers reported by respondents it seems as though only 29% of transacted volumes were sold to customers with the intention of selling them again in the future. By deduction, the other 71% of credits would be used directly for retirement.

According to the price and volume data collected in this survey we estimate the international OTC market to be worth \$258 million in 2007. Together with the CCX, which was valued at \$72.4 million, the global voluntary markets were worth a total of \$331 million in 2007. This value is approximately 240% greater than our 2006 market value (\$97 million, revised upwards from \$91 million as a result of data received this year) and therefore represents more than a tripling of the market size from 2006 to 2007.

Despite this rapid growth, the voluntary carbon markets remain only a small fraction of the size of the regulated markets (c.2.2%), which according to the World Bank transacted 2,918 MtCO₂e in 2007. That said, the voluntary markets did experience a higher (volume) growth rate of 165% compared to 71% in the regulated markets.



In 2007 there was also a major shift the primary location of project activity in the OTC market, with Asia, Europe (including Russia) and Australia increasing the number of credits sold, while North America, Latin America maintained the number of credits sold and the number of credits coming out of Africa actually decreased. Asia's share of projects has increased to 39%, up from 22% in 2006, Europe's has risen to 13% from just under 6% in 2006, and Australia has increased from 3% to 7%. Meanwhile, while producing the same number of credits, North America's share has fallen from 43% to 27% and Latin America's from 20% to 7%. In some cases, this shift reflects a move in 2007 to originate VERs from projects waiting to be approved under the Clean Development Mechanism (CDM), but that have already begun operations and are generating emission reductions. As most CDM project activity is based in Asia, in particular China and India, the pre CDM VER origination route has followed this pattern.

Credit Prices

According to this survey, the range of prices for credits in the OTC market again showed huge variation ranging from \$1.80/tCO₂e to one particularly high transaction at \$300/tCO₂e. The volume weighted price of credits transacted in the OTC market in 2007 however increased by 50% compared to 2006, rising from \$4.1/ tCO₂e to \$6.1/ tCO₂e. One of the main causes of this price increase is the significant contraction in the share of low value industrial gas projects in 2007. On the CCX, the (weighted) average price was nearly half the OTC figure at \$3.15/tCO₂e with prices falling within a narrower range of \$1.62/tCO₂e to \$4.20/tCO₂e.

The prices of other project types have shown no clear direction between 2006 and 2007, although there is consistency in the types of credits that the market values most highly. Forestry projects, in particular those involving afforestation/reforestation, have remained some of the highest priced project types across 2006 and 2007 with weighted average prices of \$6.8 to \$8.2/ tCO₂e. Methane projects also continue to be valued highly with weighted average prices in 2007 of around \$6.0/ tCO₂e, as do renewable energy projects with prices of around \$7-8/ tCO₂e. The lowest-priced credits continue to originate from industrial gas projects (\$3.70/ tCO₂e), and geological sequestration (\$2.50/tCO₂e).

Customers: Going Green or Making Green?

In terms of demand for OTC voluntary offset credits, survey respondents (excluding CCX and several brokers) cited private businesses as purchasing 80% of credits on the OTC.. As noted above, around 50% of credits were purchased by private businesses for retirement (ie to actually offset emissions), and 29% were purchased for investment/resale. Non-governmental organizations (NGOs) accounted for 13% of demand of credits transacted, and individuals purchased approximately 5%. Remarkably, governments were only responsible for 0.4% of the purchases.

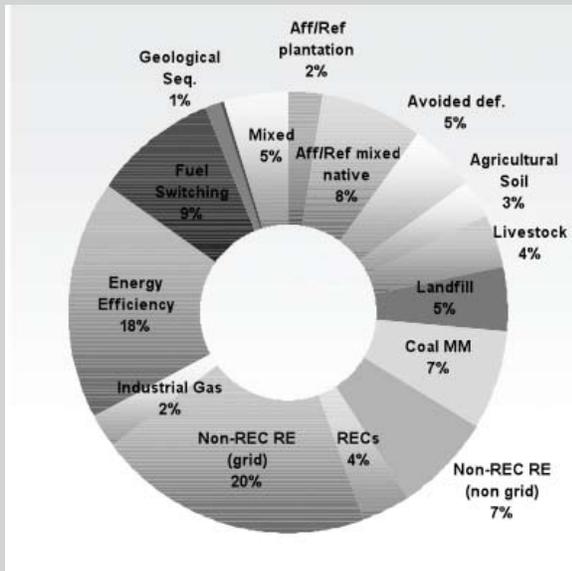
This year's survey has also highlighted a significant shift in the location of voluntary buyers. According to our survey respondents 34% of credits were sold to buyers in North America in 2007. This is in contrast to 2006 when 71% of credits were destined for buyers in North America. The demand has been picked up by Europe which represented 47% of the volume bought in 2007 (up from 28% in 2006), and Australia and New Zealand which now represent 8% of buying activity (up from 1% in 2006). The weighty number of credits purchased by Europeans clearly signals that a strong compliance market, such as the EU Emissions Trading Scheme, does not necessarily need to be a threat to the development of the voluntary market.

Corporate responsibility and public relations/branding efforts were cited (again) as the most common motivations behind carbon offset purchases. Also, similar to last year's survey, price and convenience were noted as being the least important factors when buying offsets whereas considerations such as additionality, certification, reputation and environmental and social benefits matter the most. Consumer emphasis on these latter considerations explains the appeal of "charismatic" projects such as renewable energy, energy efficiency and forestry/land use.

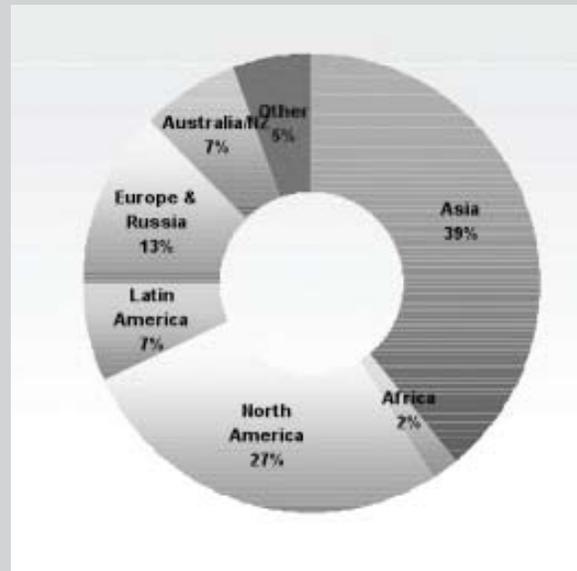
2007: Year of the Standard

In 2007, concerns about the quality of offset credits transacted on the voluntary carbon markets were a key issue. A range of articles in the mainstream press highlighted various quality issues (in particular, the importance of additionality) in the market. In response, suppliers embraced a range of tools for producing high quality credits and proving their legitimacy. Case in point: the emergence of standards and registries was one of the most noticeable trends in 2007. We were not able to obtain information on verification to a specific standard in a large percentage of transactions, but we believe that as much as 50% of the

Transaction Volume by Project Type, OTC 2007

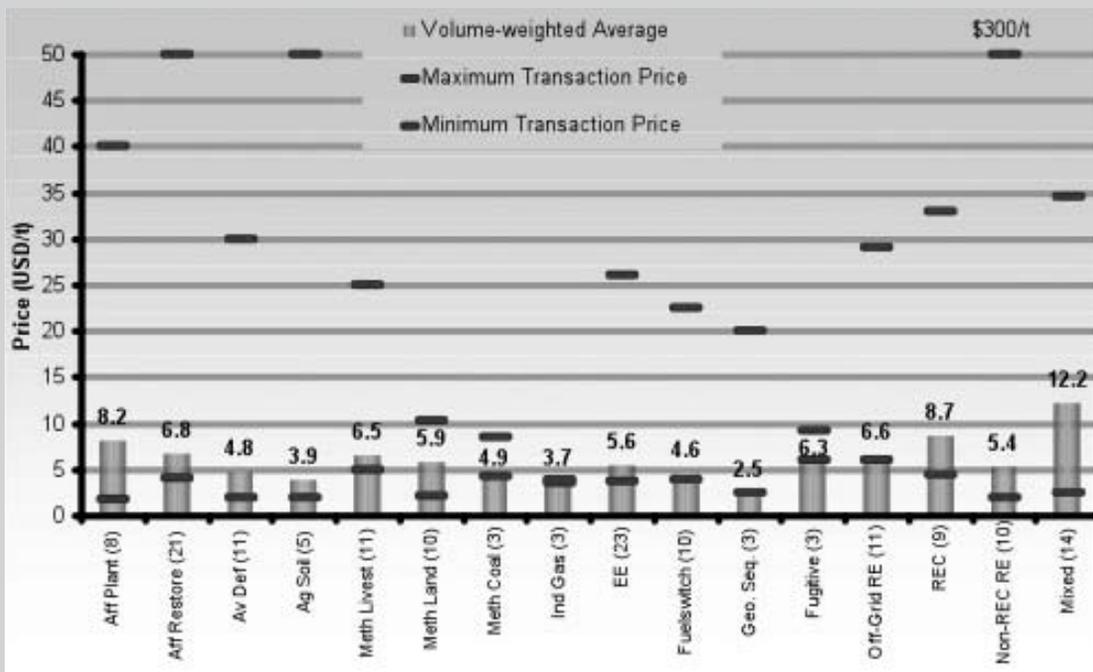


Transaction Volume by Project Type, OTC 2007



Source: Ecosystem Marketplace, New Carbon Finance

Credit Prices by Project Type, OTC 2007



Source: Ecosystem Marketplace, New Carbon Finance. Note: Numbers in parentheses indicate number of data points. The weighted average prices in this chart are not directly comparable with the price chart in last year's report. This chart shows the weighted average prices across the value chain, whereas last year's chart showed only prices from retailers, which are higher than the value chain average.

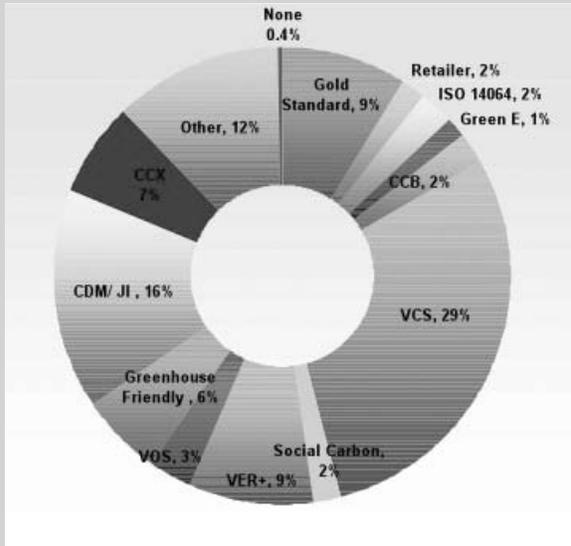
transactions conducted in 2007 involved credits verified to a specific third party standard. The Voluntary Carbon Standard, CDM, CCX, VER+ and Gold Standard were cited as the most frequently used standards.

In a similar vein, an increasing, but still limited, number of suppliers have begun using carbon credit registries. The majority of credits transacted were not listed in OTC registries but rather were registered under the CDM and the CCX. The Blue Registry was cited as the most frequently utilized OTC registry.

2008 and Beyond

As for what the future holds, the first several months of 2008 have continued to build on the trends established in 2006 and 2007. Our observation is that the market will continue to grow at a rapid pace. For example, the CCX has already reported 180% growth in the first quarter of 2008 and is on its way, if current growth is maintained, to reaching 80 MtCO₂e traded this year. We also expect the OTC also to continue its 2007 growth rate. With more and more companies establishing offset strategies and preparing for inevitable carbon legislation in countries where federal legislation does not yet exist, traded volumes in 2008 could easily exceed the 150 MtCO₂e level.

Transaction Volume by Standard Used, OTC 2007



Source: Ecosystem Marketplace, New Carbon Finance

In parallel with increased transactions it is already clear that stakeholders will continue to build market infrastructure, such as standards and registries. Responding to a survey question on the standards they planned to use in 2008, suppliers' top choices were the Voluntary Carbon Standard, the Gold Standard, the VER+, and the Climate, Community, and Biodiversity (CCB) Standard. Numerous respondents also cited plans to utilize credit accounting registries in 2008. In a select number of cases, investors are now already building exchanges for the "OTC" market, which could further change the shape of this frontier market.

We look forward to continuing to track this dynamic marketplace and presenting you with detailed information in next year's annual *State of the Voluntary Carbon Markets* report.

To download a complete version of the *State of the Voluntary Carbon Markets 2008* report visit: http://www.ecosystemmarketplace.com/documents/cms_documents/2008_StateofVoluntaryCarbonMarket2.pdf

Ecosystem Marketplace and New Carbon Finance will release *State of the Voluntary Carbon Markets 2009* in May 2009. The report will be available free online at: <http://www.ecosystemmarketplace.com>

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.

14 September 2005 | 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.

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.

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

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 view a list of companies . "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 Slieker, 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."

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 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. 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 170,00 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.

"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.

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."

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.

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Climate Change and Forestry: a REDD Primer

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.

19 May 2008 | 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.

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*.

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.

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.

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.

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.

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.

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.

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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Is the Road Through Poznan Paved with Voluntary Carbon?

by Ted Rose

Voluntary and regional carbon reduction initiatives continue to save tropical rainforests by using them as carbon sinks – along the way helping to define and standardize the means of measuring carbon captured in trees. The Ecosystem Marketplace takes stock of the latest developments in Reduced Emissions from Deforestation and Degradation (REDD).

1 December 2008 | As the climate world gathers this week in Poznan, Poland, to discuss life after Kyoto, the question of how to deal with emissions from agriculture and deforestation hovers at the edge of the debate like a wayward son: filled with potential and also dashed hopes.

While negotiators begin twisting around the layers of complexity in the international forestry debate for post-2012, on the voluntary side of the market stakeholders are moving full speed ahead in refining standards and developing projects.

The Voluntary Carbon Standard (VCS) announced its long-awaited rules for Agriculture, Forestry and Other Land Use (AFLOU) in November, underscoring the role the voluntary market hopes to assume in forging rulemaking in a sector that has generally stymied regulators. But while the chance to open up the market's doors to carbon credits from forestry appears closer, real obstacles remain. And those obstacles will be explored during the scientific sessions in Poznan – and perhaps in the closed-door political discussions as well.

The Voluntary Solution

No one doubts the land use sector's appeal. Deforestation alone accounts for roughly 20 percent of the world's annual greenhouse gas emissions, and AFLOU emissions dwarf those of heavyweight carbon producers like transportation.

Yet no asset class is fraught with more technical challenges. How does a project account for clear cutting just outside the project zone? How does a project account for wildfires and other natural disasters that can threaten carbon sequestration?

VCS has now entered a new realm — providing a third-party standard for avoided deforestation. This is commonly called Reduced Emissions from Deforestation and Degradation (REDD) in the carbon policy world.

By providing REDD guidance, as well as the framework to fold in a large variety of land-use practices under the same standard, VCS has introduced the most comprehensive approach to thorny issues of leakage and permanence in forestry projects. The approach in the voluntary market sets the stage to bring forestry into the international fold. It also demonstrates the work yet to come.

Built for Forestry

From its founding in 2007, the VCS has been well-positioned to tackle forestry issues.

The standard brought together The Climate Group, the International Emissions Trading Association (IETA), the World Business Council for Sustainable Development (WBCSD) and others interested in bringing some unity to the voluntary markets, which were hampered by the lack of standards. But the VCS also held the promise of becoming a proving ground of sorts, one in which the industry could test out promising market mechanisms in the voluntary space before advocating their adoption in regulated ones. No sector needed more help than forestry.

And yet forestry wasn't included in the original sectors covered by VCS – for a variety of reasons.

The Permanence Problem

“Permanence issues have been a real stumbling block for these projects,” explains David Antonioli, who started as VCS's CEO in October.

Permanence is the policy term that considers the risk that credited carbon benefits could reverse. A project's financing may depend on trees absorbing carbon dioxide for years, but what happens if those trees burn down three years from now? Or if they are illegally logged? Numerous solutions have been proposed to deal with permanence issues in forestry, but none have received wide acceptance.

Toby Janson-Smith, senior director, forest carbon markets, with Conservation International, wanted to tackle the permanence problem again through VCS. If a credible approach to address permanence was developed, Janson-Smith asked, would forestry be considered for VCS? The answer was yes.

“Then, it was about getting the best and brightest minds together,” Janson-Smith says.

Those bright minds met in person, spoke on conference calls and swapped emails and emerged with a concept called the buffer pool that is now enshrined in the new VCS rules as the way to overcome permanence issues in land use projects.

The Buffer Pool

The VCS aims to tackle permanence problems in the land use projects by removing the risk from the project level via a so-called “buffer pool”.

Here's how it works: Every project that applies to use the VCS standard undergoes a risk assessment, which determines how many credits from the project will be contributed to something called the Pooled Buffer Account. Depending on the risks, a project could contribute anywhere from 10% to 60% of its credits to this account.

The intention is to create fungibility of credits, explains Janson-Smith. If a project collapses, the buffer account can fill the credit gap. That means a VCS forest credit enjoys a level of insurance, free from the risks of a particular project. That means it can be traded interchangeably with any other VCS credit.

“We call it a means of insurance or self-insurance within the standard,” he says. “It’s just not managed by an external private entity that has ultimate liability.”

The concept has generally been well-received.

“It’s a good first step,” says Leslie Durschinger, founder of Terra Global Capital, a land-use project developer who estimates that roughly 40% of her project pipeline is filled with VCS projects.

“It’s quite innovative,” says Keith Paustian, a soil and crop science professor at Colorado State University who lead the VCS Agricultural Land Management expert group. “There are some distinct advantages to something like that that provides the greater fungibility.”

But actors recognize that the test of the concept is yet to come.

“I’ll tell you if I like the buffer later,” says Ray Victorine, director of Conservation Finance Program for the Wildlife Conservation Society. “I think it makes sense. But the question really is how large does it need to be? How that gets determined matters.”

Even Janson-Smith admits the real moment for the buffer concept is not outlining how it should work, but seeing how it actually does work. And to do that, there need to be projects.

“The most important thing is to get experience with actual projects and project performance,” says Janson-Smith. “In short order, we’ll have major on-the-ground implementation experience.”

The Methodology Crunch

But it isn’t just the VCS guidance that has been holding up REDD projects from getting funded by voluntary buyers. It’s the lack of approved VCS methodologies, the documents that justify credit creation on specific projects. VCS has no approved REDD methodologies as of yet, a fact that is directly impacting the market.

“This is a major blockade,” says Ross MacWhinney, a broker at Evolution Markets.

The stumbling block appears to be a lack of trained methodology reviewers.

“Anyone could submit a methodology today, but a lot of people who would be reviewing methodologies are writing methodologies right now,” says Victorine of Conservation Wildlife Society. “Their priority is to get the approved methodologies out.”

One of the more anticipated efforts is being led by Climate Focus, which is developing REDD methodology modules that will be available to all project developers to incorporate into their projects’ designs.

“Each module will deal with a chunk of methodology,” explains Robert O’Sullivan, executive director of Climate Focus North America. “One is for above-ground biomass. Another for leakage (when a reduction in one place is negated by deforestation elsewhere). There is a series of twelve pieces. Any project developer can simply pick and choose.”

Climate Focus will introduce its modules at a side event on December 5th in Poznan and then seek public comment and input. It plans to submit the modules for validation in early 2009.

REDD v Land Use

While the REDD community waits for approved VCS methodologies to advance forest protection schemes in the voluntary market, most developers working on other types of land-use projects in the United States appear to be more interested in delivering credits under CCAR.

Why? One reason is simple economics: CCAR credits are trading at a premium above VCS credits generally.

In addition, the very barriers that are restricting VCS at the moment – a dearth of methodologies and trained reviewers – do not exist in CCAR.

“CCAR seems to be more project developer friendly,” says Sean Carney, a broker with Cantor CO2e, “and the likelihood of CCAR to be accepted in future regulatory schemes is tremendous.”

Compliance REDD?

That means the real near-term opportunity for the new VCS rules lies with REDD projects. Once the methodologies start flowing, projects will begin entering the voluntary market. It won't be long before these REDD credits become candidates for the regulated market.

Indeed the same day that the VCS announced its new rules, California and two other states signed a memorandum of understanding with governors from Indonesia and Brazil to work cooperatively to incorporate REDD credits from projects in those places into the emerging regulatory schemes in America.

“That sets an important precedent,” says Janson-Smith. “That’s a key milestone.”

It certainly suggests that the wayward son of forest carbon is inching closer to taking its place in the center of the carbon market. But no one seems to think that the journey is close to finished.

“It’s crucial to have a standard everyone feels comfortable about,” says Victurine, “but it’s going to be a learning process anyway. We’re all going to be on a bit of ride.”

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Wanted: Forest Carbon Projects for ForestCarbonPortal.com

by **Steve Zwick**

Forestry advocates believe that halting the destruction of tropical rainforests is one of the easiest and most effective ways to slow global warming, and that's led to a surge in development of projects designed to capture carbon in leaves, stalks, and bogs, but no centralized information hub for keeping track of all the activity – until now. Introducing: ForestCarbonPortal.com.

23 January 2009 | When Eveline Trines founded Treeness Consult in 2002, she was able to keep a running inventory in her head of all of the projects in the world that were offsetting industrial greenhouse gas emissions by capturing carbon in trees.

“Today, there’s no way,” she says. “You’ve got one initiative tumbling over the other, and the information stream is quite intimidating.”

And it’s bound to get more so as forest carbon projects evolve from ugly duckling to golden goose in the eyes of many project developers. The result is a torrent of information relevant to forest carbon, but no way to access the right resources.

To help meet the challenge, Ecosystem Marketplace recently launched the first phase of ForestCarbonPortal.com, an online information clearinghouse for the terrestrial carbon markets. Although still under construction, the site is active and can be viewed [here](#).

SpeciesBanking.com for Trees

Like SpeciesBanking.com, ForestCarbonPortal.com is a satellite website to EcosystemMarketplace.com and includes daily news posts, Ecosystem Marketplace articles, a calendar of events, and a “tool box” of the latest intro guides, curriculums, methodologies, software measurement tools and more.

In addition to news updates and a library of resources, the Portal also includes a first-of-its-kind Forest Carbon Inventory, which tracks terrestrial carbon markets. The Inventory also maps projects selling land-based carbon credits across the globe, and makes it possible for users to search for project sites by region, as well as by a variety of criteria such as project type, standard, registry, and credit prices.

Calling all Project Developers

The site only lists projects that have sold credits or have a publicly-available project design document (PDD), and all are described in consistent ‘nutrition labels’ listing a range of criteria ([click here](#) for an example).

Forest Carbon Associate Maria Bendana has researched 250 projects so far, but only 30 have been posted – largely because verifying the information is a tedious process that begins with simple web searches and cold-calling, but ultimately involves analyzing project documentation. That tedium, she says, represents the true value to end users: because they won't have to go through it themselves.

Potential Users See Promise, Challenges

Potential end users generally agree.

“I haven't seen anything as complete and sophisticated as this,” says Trenes. “The need is definitely there – because the whole REDD (Reduced Emissions from Deforestation and Degradation) issue is so big at the moment, and it's very difficult to cross oceans every time you think there might be an interesting project out there.”

One thing the Inventory does not include is projects that have not yet been developed. Katherine Hamilton, Managing Director at Ecosystem Marketplace explains that “the goal is currently to ensure information provided is accurate and to establish a dynamic list of active projects... so the site does not currently include pipeline projects. Instead we're encouraging project developers to let us know if their project is not listed and to keep information updated.”

Joachim Sell, Head of Forestry and Biofuels for First Climate Group, is one voice asking for more. He says he'd like to see a sub-portal with more early-stage projects, even if they don't have the degree of transparency necessary.

Room for Early-Stage Projects?

Sell says that his company looks for both issued credits and early-stage projects that want to sell carbon credits on a forward basis and then use the forward contract to attract further investments or as collateral to borrow money for further development.

“A main issue for the development of carbon forestry projects will be the availability of advance payments at risk, i.e. before the project is registered,” he says. “A platform with early stage projects could help to bring players together able to commit advanced payments that help to kick-start projects.”

Bendana, meanwhile, is asking project developers interested in getting their projects on the site to contact her – and trying to figure out how she'll keep up with the paperwork if she gets what she's asking for.

“I hope they will face that problem,” says Trenes. “It would mean a lot of projects are coming their way.”

If you would like to see your project showcased on the Forest Carbon Inventory map, or if your project is already on display and you have any corrections or additions, please contact Maria Bendana: mbendana@forest-trends.org.



Stories from Brazil

How to Save the Amazon Rainforest

by Rhett A. Butler

Everyone agrees the tropical rainforests are worth more alive than dead, but our economic and political systems still fail to reflect that, with devastating results. Rhett Butler of mongabay.com takes stock of the emerging market mechanisms for protecting the world's largest rainforests.

13 January 2009 | Environmentalists have long voiced concern over the vanishing Amazon rainforest, but they haven't been particularly effective at slowing forest loss. In fact, despite the hundreds of millions of dollars in donor funds that have flowed into the region since 2000 and the establishment of more than 100 million hectares of protected areas since 2002, average annual deforestation rates have increased since the 1990s, peaking at 73,785 square kilometers (28,488 square miles) of forest loss between 2002 and 2004. With land prices fast appreciating, cattle ranching and industrial soy farms expanding, and billions of dollars' worth of new infrastructure projects in the works, development pressure on the Amazon is expected to accelerate.

Given these trends, it is apparent that conservation efforts alone will not determine the fate of the Amazon or other rainforests. Some argue that market measures, which value forests for the ecosystem services they provide as well as reward developers for environmental performance, will be the key to saving the Amazon from large-scale destruction. In the end it may be the very markets currently driving deforestation that save forests.

Is Forest Carbon the Answer?

Hope for avoiding the worst outcomes in the Amazon increasingly rests on the belief that markets will soon pay for the services provided by healthy rainforests. These services—which include biodiversity maintenance, rainfall generation, carbon sequestration, and soil stabilization, among others—have traditionally been undervalued by markets, but there are signs that the situation is changing. A major development was the decision at the 2007 United Nations Framework Convention on Climate Change (UNFCCC) talks in Bali, Indonesia, to recognize forest conservation as a means for reducing greenhouse gas emissions from deforestation, which accounts for roughly one-fifth of emissions—more than the entire transportation sector.

Excluded from receiving carbon credits under the Kyoto Protocol, the “reducing emissions from deforestation and degradation” (REDD) mechanism found new life in 2005 as a result of efforts by the Coalition for Rainforest Nations, a group of tropical countries that seek to be paid for the carbon stored in their forests. The idea has since gained momentum as a wide range of interests, including the private sector, development experts, policymakers, and environmentalists, have embraced REDD as a means to fund forest conservation

and poverty alleviation efforts to the tune of billions of dollars per year while, at the same time, fighting climate change. REDD was a hot topic of discussion at last month's UNFCCC meeting in Poznan, Poland.

Still despite its promise, REDD remains controversial and faces many challenges, including concerns over land rights; the establishment of baselines to measure reductions in deforestation rates; "leakage" when conservation measures in one area shift deforestation to another; providing sufficient incentives in "low-deforestation" countries which might lose out from REDD; and ensuring that local people see benefits. Further, because REDD is not yet sanctioned under an international framework on climate, credits from avoided deforestation are limited to voluntary markets where they are worth substantially less than carbon credits in compliance markets. For example, credits on voluntary markets like the Chicago Climate Exchange currently trade at an 80-90 percent discount to the European Union's Emission Trading Scheme (EU ETS). A political framework on REDD, coupled with binding limits on greenhouse gas emissions and measures to address the underlying drivers of deforestation, will be critical to getting REDD off the ground.

How REDD Works

REDD operates on the premise that developing countries should be compensated for reducing emissions from deforestation and degradation. Beyond this, the details – including the forests and countries included in the scheme, reference levels for measuring emissions reductions, distribution of funds, and financing – are still being negotiated during a series of UNFCCC meetings culminating in this year's Conference of the Parties in Copenhagen (COP-15). In essence REDD projects draw funding from a pool of money generated through donations, investors seeking to profit from the sales of carbon credits, or auctions of carbon credits in compliance markets, depending on the model. The funds are used to finance initiatives that promote direct forest conservation, reduce emissions from deforestation and degradation, and/or possibly involve enhancement of carbon stocks through reforestation or other activities. Ostensibly REDD offers the potential to make forest conservation pay for itself, but as past adventures in conservation have shown, it takes more than money to make conservation effective – namely forest preservation efforts must directly benefit local communities. Development experts say that REDD initiatives are doomed if they exclude local people and fail to address the underlying drivers of forest degradation and destruction.

To date, discussions laying the groundwork for proposed forest conservation financing schemes like REDD have largely excluded those who will be most affected by their implementation: rural populations living in and around forests, including indigenous people. As a result, while such mechanisms could ultimately benefit forest-dwellers, many indigenous groups strongly oppose measures to use forests as giant carbon offsets. Their opposition will likely continue until they play a greater part in determining policy.

Chief among their concerns is the potential for a "land grab" whereby governments, carbon traders, and speculators secure rights of the ecosystem services provided by forests without the consent of the people who live within the forests. In places where land rights are poorly defined, such claims could be used to evict forest people from lands upon which they have been living for generations. Therefore the development of policy mechanisms like REDD will involve thorny issues like traditional land rights as well as broader questions on how compensation will be structured and what measures will effectively conserve forests without driving more people into poverty. In the end, there is little doubt that support from forest people will be critical in making "avoided deforestation" schemes a reality.

These points were recently emphasized in a set of guiding principles for including forests in climate change issued last month by the Forests Dialogue on Climate Change, a coalition consisting of more than 250 representatives of governments, forestry companies, trade unions, environmental and social groups, international organizations, forest owners, indigenous peoples and forest-community groups.

“REDD and other climate change mitigation and adaptation measures will only achieve lasting results if they are adapted to conditions on the ground and help meet the needs of local people,” said Forests Dialogue in a statement. “Mechanisms to engage and build capacity among local stakeholders so they can participate effectively in decision-making are of fundamental importance.”

Dr. Daniel Nepstad, a leading tropical forest ecologist who now heads up conservation at the Gordon and Betty Moore Foundation, says that while these fears are valid, REDD may offer a better alternative than the status quo – which has long led to the displacement of native peoples from their lands at the hands of developers.

“REDD can benefit biodiversity conservation as well as indigenous and rural peoples,” Nepstad wrote in a report co-authored last year with Stephan Schwartzman of Environmental Defense and Paulo Moutinho of the Instituto de Pesquisa Ambiental da Amazônia (IPAM). “To succeed, national REDD programs must be consistent with UNFCCC and other UN principles, be transparent and have the active involvement of indigenous peoples and forest communities.”

“Rejecting REDD will not defend indigenous rights. Substituting official aid from developed countries for carbon market funding will not be a better, less risky alternative for reducing deforestation. Indigenous rights abuses, often caused by the same activities that drive deforestation, must be addressed directly.”

Still other groups are taking a harder line, opposing any incorporation of REDD into international climate policy until the rights of forest people are determined and other issues are worked out.

“To attain sustainable forest and climate initiatives, forest peoples must be fully consulted about their design,” said Tom Griffiths of Forest Peoples Program, an indigenous rights’ organization. “International donors must also ensure that human rights and forest sector reforms are guaranteed before any international funding is released to developing countries for their national actions on forest and climate issues.’

“It is alarming that such dangerous forest carbon trading proposals are getting traction at the UN talks while so many critical questions are left unanswered,” Kate Horner, Friends of the Earth US climate campaigner, said in a statement following the group’s release of a critique on the World Bank’s Forest Carbon Partnership Facility, an initiative to kick-start REDD projects.

“We fear that this could be disastrous for biodiversity, the rights of forest-dependent communities around the world and even our climate,” she said. “If forest carbon trading proposals are accepted, it would create the climate regime’s largest loophole by allowing rich countries to buy their way out of emission reductions.”

Buying Their Way Out

Concerns over rich countries using forestry to cheaply “buy their way out” of reducing emissions are not new. The inclusion of REDD-like mechanisms in the 1997 Kyoto Protocol was held up by this very issue with

environmental heavyweights like WWF leading the opposition. The group, along with other campaigners, argued at the time that “avoided deforestation” would allow developed countries to meet emission reduction requirements without cutting emissions from industrial sources, including power generation, construction, agriculture, and transportation. WWF and other avoided deforestation opponents feared that rich countries would be “let off the hook” by simply paying tropical countries to cease forest clearing, instead of pushing energy efficiency, pollution controls, and other measures. In the meantime, deforestation continued unabated, with Indonesia and Brazil alone losing some 300,000 square kilometers of forest -- an area the size of Italy or the Philippines -- since talks in 2001 officially excluded avoided deforestation from the Kyoto Protocol.

WWF's opposition in the face of ongoing forest destruction sparked a bitter rift among environmentalists, but at an “avoided deforestation” policy meeting in New York this September, WWF's president and CEO Carter Roberts said it would now support efforts to get forests recognized as a critical component of addressing climate change.

“The Amazon, if it were a country, would be in the top seven emitters of greenhouse gases in the world,” Carter said. “Unless the world has policies that recognize that value of standing trees and forests, we will have failed.”

“In Kyoto, WWF was pivotal in keeping forests out. We have changed our position,” he added.

REDD advocates are also winning support from non-traditional partners, including humanitarian organizations, faith-based aid groups, governments – led by Norway, which has pledged hundreds of millions of dollars per year to tropical forest conservation – and the World Bank, which has launched its own program to seed REDD projects. Nevertheless critical elements are needed to getting REDD off the ground, including a framework for forest carbon, strong commitment from polluting countries to reduce their emissions, and effective strategies for implementation, says Johannes Ebeling, an analyst for EcoSecurities, a carbon-trading firm.

“There needs to be a clear and reliable political framework in order to provide confidence to the private sectors (as well as to NGOs and others) that are willing to invest money into forest conservation (or any carbon forest activity). As long as rules are not clear – e.g. regarding eligible activities, fungibility of credits, import restrictions into important markets such as the EU ETS – the risks for most investors simply are too high,” he said, noting that prior attempts to include forestry in emissions reductions schemes have left participants disappointed. “Many early movers from back then never received the rewards they hoped for because eligibility rules changed in retrospect.”

Once a framework is in place, there needs to be “sufficient and reliable demand from carbon buyers – industrialized countries and their domestic industries – for carbon credits, including forestry credits,” says Ebeling. This requires both “ambitious reduction targets” and the possibility to use external credits – including forestry credits – to meet a portion of these targets.

Dr. Philip Fearnside, a leading researcher at the National Institute for Research in the Amazon (INPA), agrees that serious reductions are needed to both address climate change and make REDD viable.

“If the world’s governments become serious about controlling global warming, they will have to make much larger cuts in their net emissions than they have so far – lowering emissions to something on the order of 80% below 1990 levels,” he said.

“The key fact at the moment is that the overall commitments are still up for negotiation; they are not fixed beforehand as they were in the years following the 1997 Kyoto conference,” he continued. “This means that limiting or excluding REDD has no benefit for climate, and would only result in the countries agreeing to reduce their emissions by less. The focus must be in assuring that the carbon in REDD is real.”

Nepstad, along with Schwartzman and Moutinho, believes that having a strong policy framework would prevent REDD credits from flooding the carbon market, thereby triggering a catastrophic drop in carbon prices that would undermine incentives for renewables and energy efficiency initiatives.

Once climate policy is in place, the challenges of implementation will come into focus. Going beyond the difficulties of determining land ownership and rights to resources, these include “extremely challenging governance conditions in many tropical forest countries, complex land-use pressures due to scarce agricultural land and unclear land tenure situations, very high profits from alternative land-uses such as destructive logging or conversion for cash crops,” says Ebeling. “Readiness funding can address some of these if employed cleverly, but most important is political will in host countries.”

Preliminary research suggests that once a framework for develops, pure economics alone may boost REDD. In areas where infrastructure is poor and carbon stores are high, REDD may offer attractive economic returns relative to conventional logging and agricultural use of forest land, especially for rural communities, which are often bypassed by industrial development of rainforests.

For example, a study by CIFOR and the World Agroforestry Centre (ICRAF) showed that Indonesia currently is seeing benefits of \$0.34 per ton of CO₂—mostly from agriculture. By comparison, EU carbon prices are presently more than \$20 per ton. Meanwhile, research by Dr. Daniel Nepstad at the Woods Hole Research Institute has found break-even points of less than \$5 per ton of carbon for forgoing development of most of the Amazon. Cattle ranching — the leading driver of deforestation in the Brazilian Amazon — has offered significantly less than that in the past.

Further, because REDD is compatible with sustainable harvesting of forest products, low-impact ecotourism, and other environmental services payments, it could become an integral part of rural development schemes.

Taking REDD into account, the Woods Hole Research Institute estimates that reducing deforestation in the Brazilian Amazon to nearly zero within a decade would cost \$100 million to \$600 million per year, an amount lower than the opportunity cost of forgone profits from deforestation-dependent agriculture and ranching. In other words, REDD could offer the most cost-effective way to end deforestation. The Eliasch Review, a British government-commissioned report on avoided deforestation, estimates that a cap-and-trade system that includes forest carbon could generate \$11-19 billion per year by 2020 to finance forest conservation. The funds could potentially halve global deforestation rates.

Seeing the enormous potential of REDD, governments and investors are already positioning themselves for a forest carbon market. Several models are emerging for financing and distributing carbon, ranging from

profit-driven investor-backed projects to Brazil's massive Amazon Fund. Variations and hybrids of the models abound.

Market-Based Movers

Last December, the entity formerly known as Merrill Lynch became the first major US bank to invest in an avoided deforestation project, putting \$9 million towards rainforest conservation in Sumatra. The bank hoped to lock up forestry carbon credits while they were cheap and sell them at a higher price in either voluntary markets or should they emerge, compliance markets.

The deal, brokered by Australia-based Carbon Conservation between Merrill Lynch, Flora and Fauna International, the provincial government of Aceh and others, could generate up to \$432 million in gross carbon financing over the next 30 years by preventing logging and conversion of Ulu Masen forest in Aceh province for oil palm plantations. Benefits from the deal are expected to extend well beyond the bank – Aceh Governor Irwandi Jusuf sees the initiative as a key step in the region's recovery from the devastating 2004 tsunami and three decades of civil war.

To support the project, Irwandi has imposed a moratorium on logging, hired more than 1,000 former fighters as rangers, and laid out plans for the development of "forest compatible environmentally sustainable business, such as improved post harvest technologies, community-services for the nature tourism industry, forest tree and fruit tree nurseries," according to the Project Design Note. Management and administration will be conducted largely at a local level through traditional community leaders.

Since the unveiling of the Aceh deal, investor-led REDD projects have mushroomed around the world. Many of these operate as partnerships between local communities, governments, development agencies, NGOs, and carbon investors. The World Bank is helping jumpstart projects in more than two dozen countries with its \$300-million Forest Carbon Partnership Facility which builds capacity for countries to earn compensation through REDD.

Voluntary Funds

Brazil, which is home to more than 60 percent of the Amazon and accounts for nearly half of tropical forest loss on an annual basis, has a big stake in any mechanism that rewards reductions in emissions from deforestation. The country is among the world's top five emitters of carbon dioxide when emissions from land use are included -- roughly sixty percent of its emissions result from deforestation. While conversion of the Amazon and neighboring ecosystems for industrial agriculture has played a key role in the country's rise as an industrial power, Brazil is increasingly worried about the impacts of climate change and forest loss, which could devastate vast areas of farmland and put its energy supplies at risk. Sensing an opportunity to capitalize on worldwide efforts to fight global warming while simultaneously protecting elements of its economy, Brazil has proposed the establishment of voluntary fund into which developed countries, companies, and other entities pay to finance a program to reduce emissions from deforestation. With complete control over how the funds are used and no allocation of conventional carbon credits to contributors, the initiative maintains Brazil's sovereignty over the Amazon and gives it an unprecedented financial incentive to preserve the region's forest cover. The fund aims to raise \$21 billion by 2021.

Although some have questioned the voluntary nature of the concept, Norway has committed up to one billion to the scheme by 2015 contingent on Brazil's success in reducing deforestation. Others – including Wal-Mart – are rumored to be mulling contributions.

“The Amazon Fund is history's biggest experiment in conservation,” said Nepstad. “It is a bold response to a challenge issued to the world by Brazil's Minister of Environment, Marina Silva, in December of 2006, at the Conference of the Parties of the UN climate change treaty in Nairobi. Silva announced to the world that Brazil would create a tropical forest fund to help reduce their greenhouse gas emissions caused by deforestation and forest degradation. At the time, the response to this challenge was that it would be very difficult for Brazil to raise any money to put into the fund. Then along came the Norwegian government, and put a billion dollars on the table. If Brazil succeeds in substantially reducing Amazon deforestation, it can use the money.”

“What is particularly ingenious about the Norway response is that it comes with no prescription—no recipe for how to achieve the reduction,” Nepstad continued. “Unlike previous large-scale conservation programs, such as the G7 Pilot Program for the Protection of Brazilian Rainforests, the Norwegian response is ‘hands off’. Now, the ball is in Brazil's court. The key question is whether or not the Brazilian government can design a process that allows for significant engagement of Amazon forest stakeholders, and effective measures to slow the main drivers of deforestation, to achieve the reductions. This will be the first big test of REDD.”

Brazil has been vague on how the funds will be used but the Bolsa Floresta program in the state of Amazonas could serve as a model for compensating rural populations for avoiding activities that result in deforestation. The program, launched last year, includes pays forest families living near Uatuma Reserve about \$25 per month to not clear primary forest lands in return for making ‘no smoke’. Residents are also provided with health care, clean water, and greater access to education.

“The Bolsa Floresta is fine as a demonstration of how funds can reach traditional residents in the Amazon interior,” said Fearnside. “The money so far comes from the Amazonas state government's budget, which obviously is limited as a financial base. The Bolsa Floresta's connection to state-government “ sustainable development” reserves is encouraging as a stimulus to expanding the area under some form of protected status, and as a means of increasing grassroots support for the reserves [but] a firmer financial basis is needed.”

Fearnside added that he thinks the Amazon Fund will need to move beyond a voluntary model.

“The Amazon Fund is a positive development, but I believe that funds based on mandatory commitments will be a firmer basis for slowing deforestation from 2013 onwards,” he said.

But the potential doesn't end with REDD. Investors are already betting that forests will be worth more than the carbon they store.

Ecosystem Services

In March a private equity firm took the unprecedented step of purchasing the rights to environmental services generated by a 371,000-hectare rainforest reserve in Guyana. London-based Canopy Capital is effectively banking that the services generated by a living rainforest—including rainfall generation, biodiversity maintenance, and water storage—will eventually see compensation in international markets. The deal is

unusual in that 80 percent of the profit will go to local communities through micro-credit loans to sustainable economic activities, according to Iwokrama. Another 4 percent will go to the Global Canopy Program, an alliance of 29 scientific institutions that seeks to better the understanding of tropical ecosystems.

Hylton Murray-Philipson, director of Canopy Capital, says the deal seeks to develop a market for the “utility value” of living rainforests.

“The only way we are going to turn this thing around is through a profit motive. This is what is needed to harness the power of markets. But it doesn’t stop with making a profit—we are also going to have to deliver a better living for local people,” he said. “We need to start valuing the intrinsic parts of the forest as an intact entity rather than having to convert it for something else.”

Canopy Capital is working to develop an index so that forests around the world can be easily evaluated for their worth as an intact ecosystem. The beauty of the system is that it provides direct incentive for facilitating conservation efforts.

“The index would incorporate all of the characteristics to create a yardstick by which forests around the world could be measured to give a degree of uniformity for the investor,” explained Murray-Philipson. “An advantage to the rating system is that it could promote the development of new reserves and conservation areas. For example, if you are a twenty-something-year-old with a love for nature and a sharp mind it would become worth your while to go to a difficult part of the world to try to ‘improve’ a forest area by forming relationships with local beneficiaries to bring them on board, stopping illegal logging, and conducting a biodiversity survey. These actions would basically up your score in the weighting system, thereby making the forest more valuable. It’s a way of harnessing the profit motive.”

Another example comes from the island of Borneo where New Forests, a Sydney-based investment outfit now backed by AI Gore’s private equity fund Generation Investment Management, has established a wildlife conservation banking scheme based on the rehabilitation of a degraded forest reserve. The company says it expects to earn annual returns in the 15-25 percent range by selling “biodiversity conservation certifications” to palm oil developers, energy firms, and other businesses seeking to improve their environmental credentials. The funds will endow a perpetual conservation trust that will finance efforts to reduce forest fires and restore the rainforest canopy.

“We hope that via a commercial approach to conservation, we may be able to contribute to a sustainable landscape on Borneo that includes palm oil, timber production, and wildlife conservation, all being managed on a commercial basis in harmony,” David Brand, managing director of New Forests, said.

The examples suggest that a market for ecosystem services is indeed emerging and could prove to be a model for financing large-scale conservation while simultaneously providing profit opportunities for private firms. While corporations pursuing commercial interests could end up protecting global forests, poor countries could have a new way to capitalize on their natural assets without destroying them.

“Halting deforestation is an opportunity to score a big win against climate change,” Andrew Mitchell, director of the Global Canopy Program, said. “These forests support the livelihoods of 1.4 billion of the world’s poorest people, and offer services critical to humanity’s survival, such as rainfall generation and maintaining half of all life on Earth—benefits we all need but do not yet pay for.”

“Forests fall because they are worth more cut down than standing. This is a classic example of a market failure, but ecosystem services could change that,” he added.

How Much to Save?

Ecosystem services payments hinge on the capacity of ecosystems to continue to provide services. Turning back to the Amazon, a question that emerges is how much forest needs to be conserved to avoid diminishment of the services it affords humanity. Dr. Nepstad suggests we are already approaching a critical tipping point.

“The Amazon rainforest has already entered a dieback, in which the vicious cycle between land use (cattle ranching, logging), seasonal drought, and fire are rapidly degrading enormous swathes of rainforest each year. We need to bring deforestation to a halt as rapidly as possible and foster the regeneration of forest on that portion of the region’s 600 thousand plus square kilometers of cleared land that is unproductive—more 100 thousand square miles. Our goal must be 80% forest cover to protect the region’s rainfall system.”

Brazil’s target – a 70 percent reduction in net deforestation over the 1995-2005 baseline by 2018 – is less ambitious but is an acknowledgement of both the importance of maintaining substantial forest cover in the Amazon and the potential of forest carbon as an economic asset.

Market Incentives

Beyond the rise of compensation for ecosystem services, there are other signs that deforestation can be slowed, including improved fire management by large-scale landholders, growing concern in some commodity markets about the environmental performance of developers, new opportunities for sustainable development and gains in productivity, and establishment of protected areas in regions where development is expanding rapidly.

Dr. Nepstad says that landowners in the Amazon—especially those with fire-sensitive investments like orchards, intensive-cattle operations, and managed timber harvesting—are curtailing the use of fire as a land-management tool, reducing the incidence of fires that escape into neighboring forest areas.

At the same time, positive signs are coming from industry. Soy and beef producers are responding to new emphasis on environmental performance from commodity buyers—soy growers in Mato Grosso are adhering to a moratorium on clearing of rainforest for soy production, while cattle ranchers are forming their own certification system for environmental standards. The Brazilian government has recently lent support to these efforts by cracking down on illicit commodity production in the Amazon, sending in troops while implementing fines and threatening credit access to landowners who buy or trade soy, beef, and other products produced on illegally deforested lands. Still, the Brazilian government needs to do more to improve governance by rooting out corruption and enforcing existing laws. Such efforts should take advantage of the country’s state-of-the-art satellite monitoring of the Amazon, which gives Brazil the capacity to monitor from above. To be effective, Brazil needs to follow through with on-the-ground enforcement, but commodity certification systems may help substitute for governance when law enforcement falls short.

For example, in the state of Mato Grosso some cattle ranchers have turned toward an initiative led by Aliança da Terra, a Brazilian nonprofit, to take the place of a failed governance regime. Aliança da Terra seeks to

create financial incentives for producers who abide by Brazil's strict but irregularly enforced laws requiring landowners to keep 80 percent of their land forested—a limitation no rancher elsewhere in the world faces. Aliança da Terra aims to turn this restriction into a marketing advantage by guaranteeing to buyers that its certified beef is produced legally and sustainably, sometimes in excess of legal requirements. The incentive for producers is market access: Aliança da Terra helps Brazilian farmers and ranchers get the best price for their products, but only if they follow the rules. While producers get higher prices for their goods, buyers can say they are using legally and responsibly produced beef. Consequently the program ensures that more rainforest is left standing, preserving more ecosystem services and biodiversity than would otherwise be the case.

But for such certification systems to work, there must be buy-in from consumers. Now that Amazon deforestation is increasingly driven by industry, rather than subsistence agriculture, environmental advocacy groups can take advantage of corporate sensitivities to public image without the risk of undermining the livelihoods of millions of rural poor. In other words, the economic transition occurring in the Amazon has effectively given NGOs new leverage in consumer awareness campaigns.

Environmental groups can also influence policies that contribute to deforestation. For example, pressuring American lawmakers to end corn ethanol subsidies that do little to fight climate change and cause distortions harmful to the poor in the global food market can help reduce some development pressure in the Amazon. Similarly, agreeing to cuts in greenhouse gas emissions could mitigate climate change and offer ancillary benefits ranging from reduced dependence on industrial products produced on forest lands to economic incentives for forest conservation

“The single best thing (the United States) could do would be to become a leader on climate change,” said Tom Lovejoy, director of the Heinz Center, an environmental policy group. “A lot of things would then fall into place.”

Apart from U.S. policies, international approaches to addressing deforestation in the Amazon will fail unless they recognize Brazil's rights as a sovereign nation. While staunchly defending its right to develop its resources as it sees fit, Brazil has come around to the idea that preserving at least some of the Amazon is not at odds with economic growth. In fact economic integration of the Amazon as a viable ecosystem could augment livelihoods for some of Brazil's most desperate people.

Reining in new clearing doesn't necessarily conflict with economic growth through agricultural expansion in Brazil. By government estimates, the country has some 50 million hectares of degraded but arable pasture that could be used for soy and cane cultivation. More rational utilization of already cleared and degraded areas, combined with intensification of soy and cattle production, will help reduce the need to clear forest land. A particularly promising path for boosting fertility and productivity in Amazonia is biochar farming techniques similar to those used by pre-Colombian populations. The so-called “terra preta” soils offer the additional benefit of sequestering carbon, helping reduce atmospheric concentrations of CO₂.

Indigenous People

Indigenous involvement in reducing Amazon forest loss does not start and end with terra preta. Indigenous groups control more than a fifth of the Amazon and will be a key part of any “solution” to deforestation. These groups have fought for decades to win rights to the forest land they have used for countless generations. If they choose to preserve it, they should be fairly compensated. REDD may be the ideal vehicle for such

compensation, funding sustainable development initiatives and the employment of indigenous park guards. Already some indigenous groups in the Brazilian Amazon – including tribes in the Xingu and Acre – are experimenting with carbon finance as a way to preserve the forests they steward.

Recent research has shown that indigenous reserves are particularly effective at slowing forest clearing in high-deforestation frontier regions. A study by researchers at the Woods Hole Research Center and the Instituto de Pesquisa Ambiental da Amazonia found that the incidence of fire and deforestation within indigenous reserves was half that of surrounding unprotected areas.

Indigenous lands occupy five times the area under protection in parks and are currently “the most important barrier to Amazon deforestation,” according to a statement issued by the Woods Hole Research Center. “Some conservationists argue that with acculturation to market society, indigenous peoples will cease to protect forests,” but they study “found that virtually all indigenous lands substantially inhibit deforestation up to 400 years after contact with the national society.”

“Protecting indigenous and traditional peoples’ lands and natural areas in the Amazon works to stop deforestation,” explained Nepstad, who was lead author of the study. “The idea that many parks in the tropics only exist ‘on paper’ must be re-examined as must the notion that indigenous reserves are less effective than parks in protecting nature.”

Dr. Mark Plotkin, an ethnobotanist who heads the Amazon Conservation Team, a group that works with tribes to protect rainforests in Suriname, Colombia, and Brazil, agrees.

“The people who best know, use, and protect biodiversity are the indigenous people who live in these forests.”

“The best way to protect ancestral rainforests is to help the Indians hold on to their culture, and the best way to help them hold onto their culture is to help them protect the rainforest,” he added.

But it will take more than just indigenous reserves to save the Amazon. There is no magic bullet. A plan to sustainably manage the Amazon must be multi-faceted, involving a multitude of stakeholders including native people, poor colonists, and industry.

Saving the Amazon

The loss of more than 150,000 square kilometers of forest over the past eight years has shown that a business-as-usual approach will not be enough to conserve the bulk of the Amazon. Forests must offer tangible economic benefits in order for them to be protected as intact ecosystems. The ecosystem services market may be the best near-term mechanism for realizing this value. At the same time, improved governance, new market-based compensation systems that reward environmental performance, and continued expansion of protected areas will be key to saving forests like the Amazon.

Rhett Butler is the founder and editor of mongabay.com, an environmental science and conservation news web site. This story originally ran on the mongabay web site, and can be accessed in its original form at www.mongabay.com.

Picking up the REDD Tab: Who Will Pay to Fight Deforestation and How?

by Ted Rose

Brazil is at the forefront of a debate between those supporting the use of direct carbon offsets to save tropical rainforests, and others advocating a more broad-based fund approach. Ecosystem Marketplace looks south to find where the two camps are finding common ground.

25 February 2009 | When the Katoomba Group gathers in Mato Grosso, Brazil for its 14th meeting in early April, it will find itself at the crux of a vital disagreement over how best to protect existing forests.

On one hand, we have the host Brazilian state of Mato Grosso, which contains some of the most threatened rainforest in Brazil. Last November, Mato Grosso signed a historic agreement with the US state of California to jointly pursue the generation of carbon credits to fund forest protection. The two joined five other developing states as well as Wisconsin and Illinois to develop the world's first sub-national Reduce Emissions from Deforestation and Degradation (REDD) projects.

On the other hand, there is the host country, Brazil, which encompasses the forests of Mato Grosso and much more. The Brazilian government has publicly opposed funding forest protection efforts through a carbon credit generating mechanism such as REDD. Instead, it has actively courted donors for the Brazil Amazon Fund, a mechanism to protect forest cover that relies on donations from countries and organizations.

This gap between the state and the federal government hints at a long-running rift in the forest protection crowd. Should forest-rich governments rely on donations from public and philanthropic sources to support protection efforts? Or should they seek to enter financial markets and let investors subsidize their work?

For a long time, many of the world's leading conservation organizations remained as divided over the issue as the Brazilians.

Organizations like the World Wildlife Fund opposed focusing on the carbon market.

Staffers observed the well-chronicled problems in the European carbon markets and doubted these mechanisms had the muscle to fund effective reforestation efforts.

Plus, marketing forest protection as a commodity came with its own host of well-explored challenges.

"There wasn't a system to measure forest degradation," says Christine Pendzich of the World Wildlife Fund's Forest Carbon Network Initiative. "You didn't know what your baseline was and you couldn't measure reductions [from forests.]"

Meanwhile, organizations like Environmental Defense Fund (EDF) argued that private markets couldn't be dismissed, because public donations would never be equal to the task.

"If the only way we think we can avoid deforestation is by the US Congress allocating funds, that's not realistic," says EDF's Gus Silva-Chávez. "We clearly see a huge problem with non-market funding."

Now, outside of Brazil at least, this policy divide seem to be collapsing.

By the end of this year, delegates to the 15th United Nations Climate Change Conference in Copenhagen (COP-15) plan to have made final decision about forest protection's place in the global compliance carbon markets, and players seem to be lining up under a shared reality: both mechanisms will be necessary to save the worlds' forests and slow climate change.

"We are going to need a lot of money," says Pendzich of the WWF, which has abandoned its opposition to using the carbon market to help protect forests. "We're going to need it from many sources. No one funding source is the solution."

"The old way of market versus non-market is unrealistic," says Silva-Chávez of Environmental Defense, which has dropped its opposition to non-market funding.

Now, it supports spending that helps paves the way to sell emissions reductions from forestry initiatives. "What we need to do is create the right set of incentives for developing countries to start getting money to get them ready for the market," says Silva-Chávez.

And so it seems the outlines of a consensus could be emerging: use non-market funds to lay the groundwork for an eventual market-funded incentive system. Employ philanthropic dollars and government money to prepare countries around the world to sell emissions reductions from forestry.

Now, the debate has shifted to what kind of non-market spending is needed to pave the way to REDD's entrance to the carbon market – and how it should be done.

Capacity-Building

The most common answer you'll hear is capacity building. That means doing to the fundamental dirty work that would provide the fundamental guarantees for any carbon market. And it is not the type of expense that really interests many investors.

"You have to have regulations, property allocations. Who owns this carbon? People want to know that," says WWF's Pendzich. "It's a whole big rural planning exercise once you start looking at it."

Since Bali, a number of initiatives have begun to work with developing countries on this front.

The World Bank's Forest Carbon Partnership Facility is working with thirty developing countries on capacity building, using \$169 million pledged by eleven industrial countries to support the effort.

The United Nations has an entity called the UN REDD Programme Fund that has \$35 million dedicated to capacity building as well.

It is also happening country to country. Earlier this month, Norway and Guyana announced a partnership where Norway will fund the South American country's efforts to fight deforestation and prepare for REDD markets.

But the sheer number of initiatives begs the question. Is this effort being properly coordinated?

"I think that's one of the real problems," says EDF's Silva-Chávez. "You run the real risk of throwing money without knowing where it is going."

Demonstrating Upside

Climate Focus director Charlotte Streck sees another problem with the widespread focus on capacity building. It misses perhaps the most important role that non-market funding can play in jump-starting the market: demonstrating to countries a sense of what they have to gain.

"In Brazil, you have the political commitment," says Streck, "but in tropical countries you don't have a widespread commitment."

For Streck, that means providing money to help developing countries choose their own consultants. It means investing in studies that can speak in economic and policy terms to the impact of this revenue on their budgets.

"It's not a problem of monitoring, it is a problem of development," she says. "People need to understand the benefits. That is a much more ambitious undertaking, but I think it is absolutely essential."

Funding Demonstration Projects

While most non-market funding focuses on training governments, a new effort is focusing on training carbon market actors in developing countries.

Conservation International is in the pilot testing phase of a fund (a two-page overview PDF can be accessed [here](#)) designed to support field-based carbon demonstration projects.

The fund's focus is on supporting the local communities and developers as they attempt to make "investment-grade" carbon projects in advance of investor demand.

"If you look at the more than 100 forest carbon projects and some REDD projects they are all underfunded because they are living hand-to-mouth," explains Ben Vitale, Managing Director of CI's Conservation and Community Fund. "They can't find the money to get through PDD, verification and project start-up. We see that there is a gap in funding."

Vitale says CI has raised "seven figures" from a range of donors to support these efforts.

Meanwhile, Back in Brazil

So what to make of the conflict in Brazil? In one sense, the disagreement is unique to Brazil, but in another sense it could portend the future.

Brazil, after all, is one of the few places where capacity building is relatively advanced. The Brazilians have established solid baselines and monitoring efforts for their forests.

In that respect, the national government isn't an uneducated youngster, passing the hat to get schooled in the carbon market. It's more like an college graduate with a sophisticated critique.

"They are concerned that industrial countries will remain at the status quo while Brazil does all of the work," says Anthony Anderson, who is stationed in World Wildlife Fund's Brazil office.

Instead of making binding commitments to future reductions, which would be required in the carbon markets, the Brazilians would prefer to take donations to support their protection efforts. These donations have performance benchmarks for future funding (i.e. no reductions, no more money) but they won't make Brazil legally responsible if emission reductions don't occur for any number of reasons, from poor management to rapid deterioration of the world's climate.

Could other countries start making the making the same demands once they've learned the carbon ropes? Or will it be Brazil that falls into the fold?

With Brazil's own states courting the carbon market, a resolution will be necessary.

"There's going to have to be some kind of meeting of the minds on this," says Anderson. "The Brazilian government has been known to change its mind in the past."

Ted Rose consults companies and organizations on carbon offsets and renewable energy credits. He is based in Boulder, Colorado, and can be reached at ted@rosecarbon.com.

Mbaracayú: Lessons in Avoiding Deforestation

by **Steve Zwick**

8 January 2008 | 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.

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.”

Aché: 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.

Steve Zwick is the Managing Editor of the Ecosystem Marketplace.

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Guaraqueçaba: Where the Buffalo Roamed

How Global Carbon Markets and Brazilian Laws are Preserving a Patch of the Atlantic Forest

by Steve Zwick

See “Beyond Carbon” booklet or visit http://ecosystemmarketplace.com/pages/article.news.php?component_id=6524&component_version_id=9771&language_id=12 for a detailed analysis of the Brazilian state mechanisms discussed in this article

*If efforts to save the tropical rainforests by Reducing Emissions from Deforestation and Degradation (REDD) ever yield large-scale results, it will be in part because of demonstration projects like those in Brazil's Guaraqueçaba Environmental Protection Area. **Ecosystem Marketplace** takes stock of three projects launched over the past decade by two NGOs and three corporate donors in the GEPA.*

18 March 2009 | It's been more than a century since Brazilian cattlemen began shipping Asian water buffalo to the Amazon – and nearly 40 years since efforts to free up space for these valuable beasts led to a surge in chopping down the country's rainforests.

That expansion of grazing seemed to make economic (if not environmental) sense in the 1970s and 1980s – both to Brazilian ranchers whose animals grew fat on grasses growing where dense forest once stood, and to people outside Brazil who purchased the country's cheap agricultural exports.

Since the early 1990s, however, many economists have come to believe that those rainforests can yield more economic value by staying healthy and delivering environmental services than by being harvested. Key among these services is regulation of the atmosphere, with the Intergovernmental Panel on Climate Change (IPCC) estimating that rainforest destruction contributes roughly 20% of all greenhouse gasses.

By the late 1980s, Brazil's federal and state governments had begun enacting progressive environmental protection regulations, and a few forward-thinking industrial emitters had come to believe they could offset their industrial emissions by saving rainforests.

At least two non-governmental organizations (NGOs) had the same idea: the US-based Nature Conservancy (TNC) and Brazil-based Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental (SPVS).

Together, with funding from American Electric Power (AEP), General Motors, and Chevron, they purchased 19,000 hectares of land in eastern Brazil's Guaraqueçaba Environmental Protection Area, which lies in an ecosystem that has been recognized as a World Biosphere Reserve by the United Nations Economic and Social Organization (UNESCO), making it one of the planet's highest priorities for conservation. The quality of

the land ranged from standing forest to degraded pasture, and the donors hoped to offset their greenhouse gas emissions by saving the existing forests from destruction and restoring the degraded lands.

A Forty-Year Experiment

The 40-year project aims not only to reduce the donors' carbon footprints by avoiding deforestation in the Atlantic Rainforest, but also to test and expand the limits of REDD financing.

“These projects and others have basically settled the debate over whether we can measure carbon in trees,” says Bill Stanley, who runs TNC’s global climate change initiative. “SPVS has been especially good at measuring species diversity and promoting its development, and the tools they helped develop are being applied in other places as well.”

Now, he says, the challenge is more social than scientific.

“The technical issues that a lot of people thought were the major obstacles to these types of projects are not the major obstacles at all,” he says. “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.”

The Public Policy Foundation

The genesis of the project can be traced to 1985, when the Brazilian state of Parana reversed its policy of promoting agriculture in the Atlantic Rainforest and instead created the Guaraqueçaba Environmental Protection Area (EPA), mandating a phased shift to “sustainable use” of lands as determined by the EPA committee. Then, in 1992, the state initiated the ICMS Ecologico, a sales tax designed to raise funding for conservation.

Meanwhile, in neighboring Bolivia, TNC and Bolivian NGO Fundación Amigos de la Naturaleza (FAN) were putting together the first forest emissions reduction project based on international standards used in the Kyoto Protocol to be verified by a third party. That project, the Noel Kempff Mercado National Park, caught the eye of environmental NGOs across Latin America.

Realizing that income from ICMS Ecologico is a drop in the bucket compared to both income from agriculture and the cost of restoring degraded land, SPVS devised a plan to harvest funding from carbon offsets to purchase three private properties in the Guaraqueçaba EPA., which they wanted to convert to private nature reserves (Reserva Particular do Patrimônio Natural, RPPN).

The Post-Kyoto Forestry Challenge

SPVS’s plans for Guaraqueçaba were nothing if not ambitious: they wanted to save endangered forests from the chain saw, re-plant old forests, and nurture degraded forests back to health with as little intervention as possible. That meant making sure that any reforestation came as close as possible to reviving the exact same blend of trees that had been chopped down for grazing – and on top of all this, they wanted to create jobs for local inhabitants.

But they faced a serious challenge: the 1997 Kyoto Protocol had come into effect without a provision for generating offsets by saving endangered forests, leaving many NGOs in the lurch.

“We expected a lot of big companies to come in and put a lot of money into these forests,” says Miguel Calmon, who at the time was a consultant with the environmental services arm of Winrock International, a global NGO that, among other things, develops methodologies for measuring the amount of carbon captured in trees. “We had trained almost 40 other NGOs in how to conduct feasibility studies, how to structure products, how to monitor carbon sequestration, etc. so that they wouldn’t risk being unprepared when the money came, but that never happened.”

In 2000, Calmon joined TNC, and is currently director of the group’s Atlantic Forest Conservation Program.

Tapping the Voluntary Market

With compliance offsets off the table, SPVS decided to look for corporate donors interested in “gourmet” offset – those offering benefits beyond mere carbon sequestration. Having worked with TNC since the early 1990s, they turned to them for help on the financing. Fortunately, AEP was also contacting TNC to find out how it could offset its emissions by saving a piece of the rainforest, and AEP was willing to spend \$5.4 million to do so.

General Motors and Chevron soon joined the discussions as well, and SPVS began approaching local landowners with offers. By 2000, they began purchasing what eventually became 19,000 hectares of private land spread over three private reserves: the Serra do Itaqui Natural Reserve, followed by Cachoeira Natural Reserve and the Morro da mina natural Reserve.

They dubbed the three properties the Guaraqueçaba Climate Action Project, and then began putting their theories to the test.

“Assisted Natural” Regeneration

Roughly 30% of the funds went to land acquisition, with the remainder being placed in an endowment fund that is intended to provide funding well beyond the project’s 40-year life. In the near term, the endowment will cover the cost of carbon monitoring and other expenses related to the upgrade of the reserve, and long-term, the fund is designed to cover the cost of management of the reserve and working with local communities.

On degraded lands, SPVS chose to let as much forest return on its own as possible rather than to actively re-plant; and, where re-planting was necessary, they hired locals to dig through the land in search of native seeds that had lay dormant under the grazing fields.

“That was a real production,” says Stanley. “They brought the seeds to a nursery and did everything they could to get them to germinate – submerging them, cutting them – anything to get seedlings they could plant.”

To make sure the extra effort pays off in all ways possible, TNC brought in Calmon’s former employer, Winrock International.

“We basically took their methodologies and moved them forward,” says Calmon. “For example, we quantified the differences in the amount of carbon that different species of tree capture, which makes measurement more accurate.”

That work will pay off for other groups as well – helping to provide more certainty for both buyers and sellers around the world.

Giving to the Community

All of these labor-intensive activities had the advantage of bringing undocumented locals into the employment system for the first time, and the project still has roughly 50 people from the region working for it full-time, ranging from forest rangers to reforestation technicians.

SPVS also conducts ongoing training workshops in skills such as ecology, first aid, and search and rescue, and has also been working to promote sustainable business in and around the reserve. The group recently helped set up a beekeeping enterprise for the production of honey, and is in talks with more than 100 farmers interested in the production of organic bananas.

“We’re looking at lots of different ways of generating income not only in the reserve, but in the surrounding communities,” says Calmon. “Only then will you really do something about the economic drivers of deforestation.”

Keeping it Real

After purchasing the land, SPVS sent all of the buffalo off to slaughter and also conducted interviews with farmers to make sure they weren’t simply taking the money and clearing land someplace else.

“There’s a lot of debate as to how far we should go with that,” says Calmon. “We do what we can, and the Código Florestal does place limits on the amount of forest that a farmer can chop down – but we all know there is a lot of illegal logging, and ultimately the only way to really eliminate leakage is to create incentives for not doing it.”

He says that SPVS and other NGOs meet regularly to discuss ways of expanding the model across the entire Guaraqueçaba, and that local farmers are beginning to take heed.

“We used to have agriculture cooperatives, and now we have forestry cooperatives,” he says. “In the future, we won’t be buying the land ourselves, but will be working with land-owners to help them profit by keeping their forests alive.”

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Ecosystem Marketplace

The **Ecosystem Marketplace** seeks to become the world's leading source of information on markets and payment schemes for ecosystem services (services such as water quality, carbon sequestration and biodiversity). We believe 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. In providing useful market information, we hope not only to facilitate transactions (thereby lowering transaction costs), but also to catalyze new thinking, spur the development of new markets, and achieve effective and equitable nature conservation. The Ecosystem Marketplace is a project of Forest Trends. www.ecosystemmarketplace.com



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