

Voluntary Carbon Market Diagnosis



Report

Submitted by

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1 VOLUNTARY COMPARED TO REGULATED CARBON MARKETS

1.1 INTRODUCTION - DEFINITIONS

Carbon trading markets are distinguished in two major categories: the **compliance (or regulatory) markets** and the **voluntary markets**. Emissions trading, CDM and JI are part of the international regulated carbon market as prescribed by Kyoto. The largest regulated carbon market in operation is the European Union Emission Trading Scheme (EU ETS) which was launched in January 2005 and which covers 12,000 installations in the 25 EU countries.

Compliance or regulated markets rely on legally mandated emission reductions to generate the demand for emission credits or allowances, i.e., a cap is set on emissions and trading takes place to assist entities to meet their targets. **Voluntary Carbon Markets (VCMs)** are quite different schemes. The participants in a Voluntary Carbon Market are a wide range of businesses and non-profit organizations who are seeking ways of voluntarily offsetting their carbon dioxide emissions. The voluntary market is more fragmented and confusing than the regulated market and many different types of carbon trading transactions take place. However, it can provide very innovative and flexible ways for entities to address their emissions and create carbon neutral products. It is growing rapidly and starting to mature to the point where accounting, verification and certification standards are being developed that provide a good measure of the quality and value of the emission credits being created and traded.

The VCM principle and initiative has developed independently of government targets and policies and is a place where anybody, from businesses, to NGOs, to individuals can participate in the business of offsetting. Carbon credits are also created in the voluntary market, but unlike the compliance market where credits are tradable, credits in the voluntary market are generally non-fungible, in other words generally they are not tradable between different VCM schemes.

Customers in the non-legally binding voluntary market are able to purchase both credits which originate from the compliance market and credits which originate from the voluntary market. When compliance market credits are used for voluntary offsetting they do not go towards assisting or meeting any legally-binding reduction targets. An important point is that it is not always very clear to consumers exactly which type of credit they are buying. In the

voluntary market there are no commonly acceptable or compulsory standards or methodologies for creating credits. The lack of uniformity, transparency and registration in a VCM has arisen a great deal of criticism from some environmentalists who claim that it is a game of smoke and mirror rather than an engine of actual reduction of Green House Gas (GHG) emissions.

The first voluntary investments in carbon dioxide sequestration came in 1989, long before the launching of the EU-ETS in 2005, and even before the 1992 signing of the UN Framework Convention on Climate Change, which gave birth to the Kyoto Protocol. In 1989 AES Corp., an American electricity company invested in an agro-forestry project in Guatemala and reasoned that it could offset the GHGs it emitted during electricity generation by paying farmers to plant 50 million pine and eucalyptus trees on their land. The company 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 voluntary markets had their start in the desire of conservation organizations to find new ways of financing their projects. The first big deals in this sector are often deals related to forestry and the conservation of forests. Since 2003, the VCMs has gone from being the only operational initiative (1989-2003), to being virtually forgotten as the excitement over regulated carbon markets (i.e. the EU-ETS) has taken hold of the public, business, and regulatory imagination.

In 2006, this fact began to change. In a period where climate change moved from being a subject of much discussion among certain specialized circles, VCM have begun to expand, especially in cases or countries which are not obliged for Kyoto compulsory reductions. Over the past two years, the media attention and corporate interest in the voluntary carbon markets has grown exponentially, probably at a far more rapid rate than the markets themselves. The concept of “**carbon neutral**” evolved from a little-know concept to the New Oxford American Dictionary’s “Word of the Year.” At the same time standards, reports, and consulting firms began sprouting up to address concerns about offset quality and the difficulty of navigating this marketplace.

There is no formal tracking of the market, but a few studies have been done in an effort to contribute to better organisation of VCM activities. The voluntary market remains somewhat difficult to categorize, and its boundaries are difficult to define, but estimates of the size of this market range from 2 million tonnes (for specific retail-style carbon offsets) to up to 20 million tonnes, including a whole range of voluntary offsets, retail offsets, green power programs, etc. There is no question the market has matured

dramatically in the past two years, and most participants feel that the market is growing by 100% or more per annum at this point.

Organizations ranging in size and character from small NGO's to events organizers to major multinational corporations are determining that climate change is an important issue to their customers or stakeholders, and they are taking action to reduce the greenhouse gas emissions associated with their business, event or product. While this may have seemed a quirky thing to do ten years ago, its recent embrace by major mainstream businesses has pushed the voluntary carbon market to a tipping point.

The encouraging message is that the voluntary markets give each individual a choice to contribute to the solution. The significant new capital in the market motivates the best and brightest in our societies to put their considerable talents in favour of a low-carbon future.

1.2 INTERNATIONAL EXPERIENCE

The voluntary carbon markets include all carbon offset trades that are not required by regulation. VCM transactions include:

- the purchase of carbon credits by individuals or institutions at a retail level to offset their emissions;
- the purchase of credits directly from project developers for retirement or resale;
- and the donation to GHG reduction projects by corporations in exchange for credits.

At the broadest level, the VCMs can be divided into two main segments: the **voluntary, but legally binding**, cap-and-trade system that is the Chicago Climate Exchange (CCX); and the broader, **non-binding, over the counter (OTC) offset** market (bilateral agreements and contracts).

1.2.1 The UK Emissions Trading Scheme

Three years before the EU launched its trading scheme, the UK government launched the UK ETS in March 2002. This was a voluntary scheme and the world's first cap-and-trade GHG emissions trading scheme. The system ended in December, 2006, and final market reconciliation occurred in March 2007, five years after its launch. Over the lifetime of the scheme, thirty-three “direct participant” organizations achieved emissions reductions of over 7.2 mil tCO₂eq. In 2006, about 11.9 mil tCO₂eq were traded.

1.2.2 Chicago Climate Exchange (CCX)

CCX defines itself as “the world’s first and North America’s only voluntary, legally-binding, rules-based greenhouse gas emission reduction and trading system”. CCX is driven by a membership-based cap and trade system. Members voluntarily join CCX and sign up to its legally-binding reductions policy. Like the Kyoto markets, CCX trades 6 different types of GHGs converted into a common unit of tCO₂eq. The CCX’s unit of trade is the Carbon Financial Instrument (CFI), which represents 100 tCO₂eq. CFIs can be either allowance-based credits, issued by emitting members in accordance with their emission baseline and the exchange’s reduction goals, or offset credits generated from qualifying emission reduction projects.

In 2006, CCX’s membership grew from 127 to 237 members. Membership has since expanded to 312 members. There are three levels of membership:

- **Full Members** are “entities with significant direct greenhouse gas (GHG) emissions and whose commitments are audited by NASD (formerly known as the *National Association of Securities Dealers* is an industry organization representing persons and companies involved in the securities industry in the United States). Members who joined in Phase I committed themselves to each reducing GHG emissions 1% a year from a baseline determined by their average emissions from 1998 through 2001. The current goal (Phase II) is for members to reduce their total emissions to 6% below the baseline by 2010. Hence, members who have been participating for the past four years only need to reduce an additional 2%, while new members need to reduce 6% during this time.
- **Associate Members** are “entities with negligible direct GHG emissions, such as office-based institutions, businesses and service organizations. Associate Members commit to report and fully offset 100% of indirect emissions associated with energy purchases and business travel from year of entry through 2010 and are audited by NASD.
- **Participant Members** are project developers, offset Aggregators and liquidity providers, which trade on the Exchange for purposes other than complying with the CCX emissions reduction schedule.

In 2006, about 10.3 mil tCO₂eq were transacted on CCX. As of July 2007, a total of 26.3 mil tCO₂eq had been traded on the exchange. While all CCX credits are transacted voluntarily, the exchange does

have links to the regulated markets and even accepts EUAs (European Union Allowances for EU ETS). In 2006, at least 1,000 EUAs were transferred into the CCX by a multi-national member. However, at the end of 2006, as EUA prices for 2007 contracts plummeted, this link between markets was suspended.

In 2005, the CCX also launched the European Climate Exchange (ECX), which has since become the major exchange for EU ETS allowances and intends its activity by setting up carbon exchanges in US North-eastern States, New York and California.

1.2.3 The non-binding offset market

Outside of CCX one finds a wide range of voluntary transactions that make up an overall voluntary market that is not driven by an emissions cap. Because this market is not part of a cap-and-trade system, where emission allowances can be traded, almost all carbon offsets purchased in this voluntary market originate from project-based transactions.

Hence, this market can be referred to as the voluntary offsets market or because it does not operate via a formal exchange, it can also be referred to as the voluntary Over The Counter (OTC) market. The credits in this market are often generically referred to as **Verified** (or Voluntary, depending on the source) **Emissions Reductions (VERs)**, or simply as carbon offsets.

Voluntary offset market demand is not driven by a cap, especially in the retail market, but by Buyer motivations related to:

- willingness to manage their climate change impacts,
- an interest in innovative philanthropy,
- public relations benefits,
- the need to prepare for (or deter) national/regional regulations, and plans,
- to re-sell credits at a profit.

In several cases, governments have instituted voluntary emission reduction and carbon offset purchasing programs. These programs are actually screened as contributing to a country's regulatory requirements or Kyoto commitments. For example:

- **Japan's Keidanren Voluntary Action Plan** on the Environment: Japan's Kyoto commitment is to reduce GHG emissions to 6% below those of the 1990 level in the first

commitment period from 2008 to 2012. One aspect of the country's reduction strategy is the Keidanren Voluntary Action Plan, which encompasses 58 different Japanese business associations. Member companies have committed to collectively reduce their total emissions to 1990 levels by 2010. To achieve this goal, companies are both reducing their own emissions and purchasing Kyoto CDM or JI credits. While these credits are, in theory, purchased voluntarily, the only viable offsets are from Kyoto mechanisms. Furthermore, purchases are accounted for in a national registry system and are used to meet Kyoto commitments.

- The **Australian Government's Greenhouse Challenge Plus** program was created to help Australian companies improve energy efficiency and reduce GHG emissions. This program includes emission reduction progress reporting and technical assistance. However, a particularly unique aspect of the program is the Greenhouse Friendly Initiative, which certifies credits from emission abatement programs as well as '**carbon neutral**' claims. Australia has not joined the Kyoto Protocol and greenhouse emissions are not regulated at a national level. Furthermore, the program allows entities to utilize credits that are not part of a regulatory system.

Characteristic examples of independent projects carried out in the framework of bilateral agreements aiming at reducing GHG emissions and could be considered as VCM offset projects have been collected from World Bank (WB) reports and are presented in the following paragraphs. The evolution from sequestration projects in the 90s to use of renewables in recent years indicates a change in the approach for GHG emission reduction.

1. Guatemala

In 1989 the first forestry project funded explicitly for offsetting began in the Western Highlands of Guatemala. The project was run by CARE with the United States Agency for International Development (USAID) and the Guatemalan Directorate General of Forests to offset an 183MW coal-fired power station in Connecticut. The intention of the project was to establish 12,000 ha community woodlots, 60,000 ha agro-forestry, and 2,880 km live fences protecting vulnerable slopes in local watersheds.

An external evaluation has shown the project has fallen far short of the one million tonnes of carbon it was supposed to offset.

2. Ecuador

Forest Absorbing Carbon Dioxide Emissions (FACE) was established by the Board of Management of the Dutch Electricity Generating Companies in 1990 to offset a 600MW coal-fired power station in The Netherlands. FACE intended to establish 150,000 ha tree plantations in developing countries.

Programme for Forestation (PROFAFOR) in Ecuador is FACE's largest project, set up in 1993 to plant 75,000 ha trees. This was later revised to 25,000ha, which has still to be achieved.

3. Uganda

A forestry project was setup in Bukaleba in 1995 in a Ugandan government forest reserve by Tree Farms, a Norwegian forestry company, with grant aid from the Norwegian Agency for Development Cooperation (NORAD) to offset emissions from new gas-fired power stations to be built in Norway. The land was gained for Tree Farms on a low cost lease from the Ugandan government.

4. Costa Rica

The Costa Rican government Environmental Service Programme pays landowners to establish plantations, and gets carbon rights in exchange. The Environmental Service Programme then sells these rights on the global carbon market.

5. Sri Lanka

A rural solar electrification programme was set up in 1997 to offset emissions in the US state of Oregon by preventing emissions from kerosene lamps used in houses without electricity.

6. Durban, South Africa

A project has been developed in Durban to extract methane from the Bisasar Road landfill site to use for electricity generation. The electricity generated will replace electricity otherwise generated from coal, and so lower CO₂ production as methane produces less CO₂ per unit of energy than coal.

7. Guguletu, South Africa

The British company Climate Care began a project in 2005 to replace incandescent bulbs with energy efficient ones, where locals would have otherwise been unable to afford to switch.

1.3 MARKET SIZE AND TRENDS

The recent report of World Bank “State and trends of the Carbon Market 2007” gives an overall view of the current situation of carbon markets including legally binding VCM (only CCX at present). The volumes in terms of mil tCO₂eq and values in mil US\$ for the years 2006 and 2007 are presented in Table 1.1.

	2005		2006	
	Volume (MtCO ₂ e)	Value (MUSS)	Volume (MtCO ₂ e)	Value (MUSS)
EU ETS	321	7,908	1,101	24,357
New South Wales	6	59	20	225
Chicago Climate Exchange	1	3	10	38
UK ETS	0	1	na	na
TOTAL	328	7,971	1,131	24,620

Table 1.1: Annual Volumes and Values of Transactions on the Main Allowances Markets (source: WB)

The main conclusion is that the EU ETS continues to be the most prominent of these markets in terms of overall volume and financial value transacted. Both the New South Wales (NSW) Greenhouse Gas Abatement Scheme and the Chicago Climate Exchange (CCX) saw both volumes and values increasing by a factor of three or more in 2006. However, the percentage of allowances traded through CCX is still very small compared to the EU ETS.

CCX saw record-breaking transacted volumes of 10.3 mil tCO₂eq in 2006 (seven times higher than the previous year) at a value of US\$38.1 million or €30 million (thirteen times higher). Most transactions occurred in the second quarter of 2006, which alone saw about 56% of the year’s traded volumes, peaking with May 2006 volumes of over 3.2 mil tCO₂eq transacted for a value of US\$10.9 million (€8.4 million). The average price of carbon (for all vintages) on the CCX continued to rise in 2006: from a low of US\$1.73 in January 2006, the monthly average price increased to US\$4.50 in July 2006 before settling in the US\$ 4.00-4.20 price band for the remainder of the year, before declining to about US\$3.70 earlier this year (2007).

On the other hand, the overall value for the **project-based market** for primary credits, including the OTC, offset projects of VCM, was US\$5 billion in 2006 (€3.9 billion), as values for both CDM and JI

more than doubled over what they were the previous year. Table 1.2 presents the evolution in the years 2005-2006 of this component of carbon markets.

	2005		2006	
	Volume (MtCO ₂ e)	Value (MUS\$)	Volume (MtCO ₂ e)	Value (MUS\$)
Compliance	382	2,894	508	5,477
of which				
Primary CDM	341	2,417	450	4,813
Secondary CDM	10	221	25	444
JI	11	68	16	141
other	20	187	17	79
Voluntary market	6	44	10 +	100
TOTAL	388	2,937	518	5,577

Table 1.2: Annual Volumes and Values (2005-2006) for Project-based Transactions (source: WB)

A strong majority (about 91%) of primary transactions for project-based credits came from CDM activities that is 450 mil tCO₂eq, representing an increase of 32% from 2005 volumes. This number reinforces the view that European and Japanese demand, and price formation under the EU ETS sent a clear price signal and incentive to developing countries to develop CDM projects.

The volume and value of transactions treated under VCM activities almost doubled in 2006 from 2005, but the share remains still too small compared to the total. Because it is impossible to capture all OTC transactions in a survey, the actual volume traded may be considerably larger than this amount.

Much of the demand driving the VCMs comes from the developed and more environmentally aware markets in North America and Europe. Survey respondents reported that 68% of their customers are based in the United States and 3% in Canada. In addition, about half of the suppliers responding to survey were based in the U.S. and roughly 43% of carbon offsets sold in the OTC market were sourced from North American-based projects. Europe was also a major source of market demand and supply in the market, with 28% of the survey respondents' customers based in the EU and a little over 30% of suppliers based in the EU. About 10% respondents were based in Australia.

As could have been expected, businesses were the largest buyers (by volume) in this market, but contrary to expectations, anticipation of future regulation did not appear to be the main motivation for purchases. According to buyers surveyed, their main motivations for participation in the market were corporate social responsibility.

Voluntary carbon markets have historically served as sources of experimentation and innovation in the carbon markets, as well as the markets most likely to reach poorer and smaller communities in developing countries. This is, in part, because they lack the bureaucracy and transaction costs of their regulated counterparts. For example, compared to the Kyoto regulatory markets the voluntary OTC markets are currently the only source of carbon finance for avoided deforestation, have a higher proportion of forestry based credits out of total market transactions than the CDM (36% vs. 1% for CDM), and a slightly higher proportion of credits sourced from Africa (6% vs. 3% for CDM). Moreover, the VCMs seem to be a particularly hospitable climate for smaller offset projects. More respondents cited selling offset credits sourced from micro projects, generating less than 5,000 tCO₂eq, than any other project type. Around 36% of offset credits in the OTC market were sourced from projects less than 100,000 tCO₂eq. This provides greater opportunities for voluntary markets to contribute to sustainable development in smaller communities.

Overall, the OTC market is dominated by three types of projects: forestry sequestration (36%), renewable energy (33%), and industrial gases (30%). The location of offset projects is depicted in Figure 1.1.

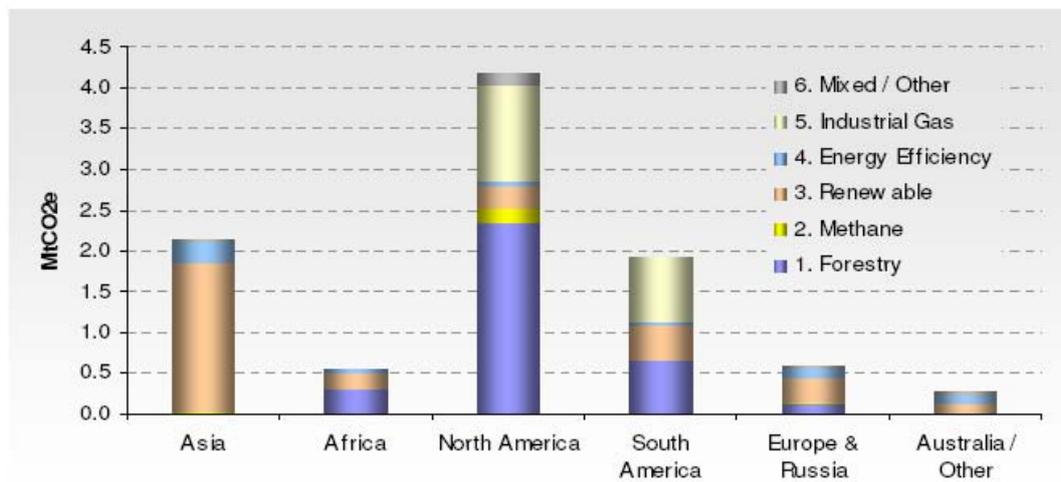


Figure 1.1: Transactions by project location, 2006 (source: Report of *New Carbon Finance* and *The Ecosystem Marketplace* on “State of Voluntary Carbon Markets 2007)

The voluntary carbon markets have seen dramatic growth since 2003-2004. There is something extremely appealing about a business model that caters to the better instincts of mankind to make the world a better place. This is important since a significant number of companies are now offering project-based emission reductions to:

- individuals that may wish to offset GHG emissions linked to their way of life (residential energy use, commuting, travel),
- to customer-facing companies that wish to offset GHG emissions from their operations or from specific products or events (sports, concerts, conferences but also travels, mortgages, utility bills, shipping and other goods and services their customer may wish to render carbon neutral),
- to high emitting companies that may wish to voluntarily offset the GHG emissions from some portion of their activities that they cannot immediately reduce through their operations.

Carbon offset suppliers are increasingly competing to provide the climate-friendly face of the company to its customers, one more customer facing attribute of its service. In addition, a number of major companies (in the US, for instance) have been issuing tenders to source offsets linked to voluntary commitments, carbon neutrality or anticipated compliance. To the extent the emission reductions from the underlying projects are credibly “additional”, these numbers could further enhance the effort for global emission reductions. In particular, this segment could be of interest to those African countries not reached by the compliance market, but where there are good opportunities to reduce emissions by efforts that could bring electricity, health or education services to a village, where there was little or no prospect for any development.

Prices observed on the retail market range widely from a low of US\$1 to US\$78 (Bellassen and Leget, (2007) Caisse des Dépôts Climate Taskforce Research report N°11). Companies in this segment are looking for bigger volumes of VERs of around 50,000 to 100,000 tCO₂eq in the range of US\$1 to US\$15. The integrity of the offset traded has the biggest influence on price and is often measured across one or more of the following parameters:

- the additionality of the project (making sure the project is not claiming reductions that would already occur),
- the actual existence of the emission reductions (making sure the project activity is monitored and that emissions reduction claimed are verified),

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- the exclusion of double-counting (making sure the same emission reductions are not sold to several buyers at the same time),
 - the permanence of the reduction (making sure the emission reductions are not temporary) and the existence of community benefits.

2 VOLUNTARY CARBON MARKET STANDARDS

Customers in the non-legally binding voluntary market are able to purchase both credits which originate from the compliance market and credits which originate from the voluntary market. When compliance market credits are used for voluntary offsetting they do not go towards assisting or meeting any legally-binding reduction targets. An important point which will be addressed below is that it is not always very clear to consumers exactly which type of credit they are buying. In the voluntary market there are no overarching or compulsory standards or methodologies for creating credits. There are however, a number of voluntary standards emerging in an attempt to bring greater robustness and harmonisation to the voluntary offset marketplace.

For the past several years, concerns have mostly been raised by stakeholders deeply involved in the voluntary carbon markets about quality of offsets and VCM transactions. Therefore, in the past 18 months there have been a range of efforts to shape the OTC voluntary carbon market into a more consumer friendly arena. These efforts include: analysis and reviews of retailers, offsetting guides, standards & certification programs, and registries.

In 2006 and early 2007, several non-profit organizations based in the United States worked to screen offset retailers for individual and corporate consumers. Such efforts are important part of helping potential customers navigate the market. However, most major market players agree that, in the end, standards and registries will be needed in order to truly increase the legitimacy of the marketplace, because standards and registries will inevitably become central point to the future strength of this market.

2.1 EXISTING VOLUNTARY STANDARDS

The VCMs have become fertile ground for the development of protocols, standards and certification programs designed to ensure rigor and quality at various levels in the supply chain. In fact, the arena of standards is evolving so quickly that most of the standards described in the following sections did not exist in 2006, and two of the standards mentioned had not even been announced prior to March of 2007.

In the standards arena, similar terms may cover a diverse range of activities. Based on programs use of the words, the terms Protocols and Standards are used interchangeably. Guidelines are less

prescriptive and are generally not part of a certification system. The term certification includes both a standard and the next step of verification to that standard.

The standards and certification schemes for the voluntary carbon market can be divided into two broad categories: First, there are those whose purpose is to certify the quality of the offsets and the projects that generate them. These include the Voluntary Carbon Standard, the Gold Standard, Plan Vivo, the Climate, Community, and Biodiversity Standard, ISO 14064 and, to some extent, the California Climate Action Registry's offset-related protocols. The second set of standards focuses more on certifying offset sellers, products, services, and/or the claims of carbon neutrality being made by individuals and institutions. These include the Green-e for GHG Product Standard, DEFRA's Guidelines, and the Climate Neutral Network. The Australian Greenhouse Friendly program, meanwhile, certifies both offset projects and greenhouse neutral products and services and therefore fits in both categories.

In addition there are retailer-created standards, which had historically been developed by retailers (e.g. the Carbon Neutral Company, MyClimate, and various others) to ensure and guarantee quality in their portfolios. While these standards have been critical in ensuring quality in the market prior to 2006, they can be seen as engendering conflicts of interest and are likely to be abandoned in favour of third-party standards in the future.

In the following sections some of the well known standards will be presented in brief, however placing the emphasis on the quality of offsets standards. A more detailed presentation of some of the most prominent standards is included in Annex 1.

2.1.1 WBCSD/ WRI GHG Protocol

The World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI) Protocol for Project Accounting (WBCSD/WRI GHG Protocol) is a widely-accepted set of guidelines used by project developers and incorporated into numerous standards, such as the California Climate Action Registry (CCAR) Protocols and ISO 14064. The GHG Protocol **aims at harmonizing GHG accounting and reporting standards internationally to ensure that different trading schemes and other climate related initiatives adopt consistent approaches to GHG accounting.** This Protocol was created along with a GHG Corporate Accounting and Reporting Standard. Neither the GHG Protocol nor Corporate Standard is a certification system or verification standard itself.

2.1.2 The California Climate Action Registry's Protocols

The California Climate Action Registry (CCAR) was established by California statute as a non-profit voluntary registry for greenhouse gas (GHG) emissions. CCAR has developed a General Protocol and additional industry-specific protocols which give guidance on how to inventory GHG emissions for accounting in the Registry (i.e. what to measure, how to measure, the back-up data required, and certification requirements). The Registry has also developed project protocols that allow for the quantification and certification of greenhouse gas emission reductions. It is **these protocols that essentially serve as a verifiable quasi-standard for voluntary carbon offsets**. Already, some US companies have announced that they intend to buy voluntary carbon offsets that meet the CCAR emission reduction protocols. CCAR currently has approved reduction protocols for livestock activities and forest activities.

2.1.3 ISO 14064

The ISO 14064/65 is part of the International Organization for Standardization (ISO) family of standards. The standard currently includes four components:

- **Organization Reporting** and quantification of greenhouse gas emissions (ISO 14964 Part 1);
- **Project Reporting** of project proponents quantification, monitoring and reporting of greenhouse gas emissions reductions (ISO 14064 Part 2);
- **Validation and Verification** of greenhouse gas assertions from organizations or projects (ISO 14064 Part 3);
- **Accreditation of Validation and Verification Bodies** focusing on the accreditation or recognition of competent greenhouse gas validation or verification bodies.

Like the Voluntary Carbon Standard, ISO 14064 was created to ensure that **a tonne of carbon is always a tonne of carbon**. The ISO standards were not created to support a particular GHG program, but were instead designed to be **regime neutral** so they could be used as the basis for any program. ISO does not certify or register GHG emissions or credits but do provide an accreditation, validation/verification, quantification and reporting implementation framework.

2.1.4 Climate Neutral Network

Several US-based companies working to offset their emissions have linked with the Climate Neutral Network, a non-profit with the goal of **helping companies, communities and consumers achieve a net zero impact on the earth's climate**. The organization certifies products, events or organizations with its Climate Cool logo as a brand trademark. Climate Neutral Network certifies projects and also works directly with institutions to become 'net zero' emitters or to create products for the consumer market. Examples of events and products certified by Climate Cool include: a concert tours, business operations, etc and Interface's Climate Cool carpet product. The Network has also certified two organizations selling retail offsets.

2.1.5 Climate, Community, and Biodiversity (CCB) Standards

Like the Gold Standard and Plan Vivo, the Climate, Community, and Biodiversity (CCB) standards are particularly focused on positive social and environmental co-benefits and can be applied to CDM or voluntary market projects. However, the CCB Standards **are completely focused on land-based carbon sequestration projects**. The development of the CCB Standards was spearheaded by the Climate, Community and Biodiversity Alliance (CCBA), which is a partnership between a range of corporations as well as research and non governmental organizations, such as Conservation International, The Nature Conservancy, Weyerhaeuser, Intel and CATIE. The CCB standard focuses on projects and while it does include ensuring the project has the potential to produce estimated sequestration credits, it does not include verification that credits are generated.

2.1.6 Greenhouse Friendly

The Greenhouse Friendly Initiative is the Australian Government's voluntary carbon offset scheme for encouraging GHG emissions reductions at several levels. It concentrates among others on **providing businesses and consumers with the opportunity to sell and purchase greenhouse neutral products and services**. The Initiative provides two different services:

- **Greenhouse Friendly Abatement Provider** (offset project) certification; and
- certification of **carbon neutral** products and services.

Criteria for Greenhouse Friendly project certification include: being Australia based, generating additional, permanent and verifiable

greenhouse gas emissions reductions or sequestration, as well as clearly demonstrating that the abatement generated is additional to business as usual. The Greenhouse Friendly carbon-neutral accreditation requires the preparation of an independently verified, life cycle assessment, an emissions monitoring plan, annual reports, and use of Greenhouse Friendly approved carbon offsets.

2.1.7 The Gold Standard

The Gold Standard seeks to define the **high-end, market for carbon credits arising from renewable energy and energy efficiency projects**, and which also contribute significantly to sustainable development. The standard specifically excludes forestry or land use projects. The standard was an initiative of the World Wildlife Fund (WWF) and developed with a variety of other NGOs, businesses and governmental organizations, who believed that the Clean Development Mechanism did not adequately screen projects for their contribution to sustainable development. While the standard was originally created to supplement CDM projects, it now also certifies voluntary offset projects. The standard is in the midst of creating registry procedures for VERs to ensure that they cannot be sold multiple times.

2.1.8 Plan Vivo

Plan Vivo is a standard specifically designed for community-based agro forestry projects. It is considered as **a system for promoting sustainable livelihoods in rural communities, through the creation of verifiable carbon credits**. The system was created seven years ago by the Edinburgh Center for Carbon Management (ECCM) and is now managed by the non-profit organization BioClimate Research and Development (BR&D). Plan Vivo currently has three fully-operational projects in Mexico, Uganda, and Mozambique, which are producing carbon for the sale of Plan Vivo carbon offsets. The Plan Vivo system aims to ensure that its projects deliver: social benefits, biodiversity benefits, transparency, additionality, foundations for permanence, an ethical option and scientific and technical partnerships.

2.1.9 Social Carbon

The Social Carbon methodology and certification program was created by the Brazilian NGO Ecologica. The methodology is based on a sustainable livelihoods approach focused on improving **project effectiveness by using an integrated approach which values local communities, cares for peoples potential and resources, and**

takes account for existing power relations and political context. While it was originally created to assure higher quality Kyoto Protocol carbon projects, the program methodology is now also used for voluntary market projects. The Social Carbon methodology has been used in hydrology, fuel switching, and forestry projects in Latin America and Portugal since 2000. Recently the program launched a connected certification program to verify project use of the methodologies and credits resulting from these projects.

2.1.10 DEFRA's Voluntary Code of Best Practice on carbon offsetting

In early 2007, the United Kingdom's Department for Environment and Rural Affairs announced a plan to establish a Code of Best Practice in order **to give consumers clarity and confidence when they choose to offset.** A key feature of the plan is the initial suggestion to customers to only purchase Certified Emission Reductions (CERs), EU Allowances (EUAs), and Emission Reduction Units (ERUs) from the robust and verifiable regulated markets rather than VERs from the voluntary markets. However, DEFRA recently considered high-quality VERs from the non-regulated market is also under consideration. The code also seeks to educate customers about offsetting as a means for climate change mitigation, bolster consumer confidence in the emission markets, encourage the UK's offset industry to develop standards consistent with DEFRA's consumer oriented code, and facilitate the development of a robust and liquid global market infrastructure for carbon trading. The Code was open for consultation through April 2007 and is now under review.

In addition, and in collaboration with BSI British Standards, DEFRA recently announced that it will join forces with the Carbon Trust and BSI British Standards to create a standard means of measuring embodied GHG emissions which can be applied across a wide range of product and service categories and their supply chains to enable companies to measure the GHG related impacts of their products and reduce them. The overall objective is to establish a **single standard** that will ensure a consistent and comparable approach to supply chain measurement of embodied GHGs across markets.

2.1.11 ECIS Voluntary Carbon Offset Standard

In June, 2007, a group of more than 10 banks and financial institutions organized under the European Carbon Investor Services (ECIS) and including ABN Amro, Barclays Capital, Citigroup, Credit Suisse, Deutsche Bank and Morgan Stanley, announced they

were creating a standard for carbon credits in the voluntary markets. This standard is described the standard as a **robust benchmark with environmental integrity in the voluntary market**. The voluntary offset standard is aimed at brining the voluntary market up to the level of the regulated and standardized procedures of the compliance market. The standard is broadly very similar to the CDM and JI, only it applies methodologies to an eligible geographical area beyond those countries that have ratified the Kyoto protocol and is focused largely on the United States and Australia's pre-compliance markets. Notably, it excluded carbon credits arising from the destruction of industrial gases such as HFC-23.

2.1.12 Green-e GHG Product Standard

The Green-E Product Standard was developed primarily to **provide certification services for retail providers retiring carbon credits to sell as carbon offsets to customers**. This standard is aimed primarily at North American retail providers and sales of GHG emission reductions. The standard will utilize other accepted project based standards such as the Gold Standard, CCB Standards, or VCS, although the exact list of approved standards has yet to be determined. The Green- e Product Standard for carbon offset sellers aims to ensure accurate accounting practices; that carbon credits are additional and independently certified; and that sellers have disclosed relevant information about offset sources. As of June, 2007, the Standard is still in the midst of development and open for stakeholder comments.

2.1.13 VER+ Standard

In May, 2007, project verifier TÜV SÜD announced their VER+ Standard, which will **certify carbon neutrality as well as credits from voluntary carbon offset projects**. The standard will be based on CDM and JI methodology. The standard is considered as streamlined with Kyoto. In tandem with VER+, TÜV SÜD also announced **BlueRegistry**, which aims to be a platform for managing verified emissions reductions from a variety of other standards, including CCX and the Voluntary Carbon Standard, as well as green certificates.

2.1.14 The Voluntary Carbon Standard (VCS)

Voluntary Carbon Standard's "Version 1 for Consultation" has been publicly available sine March 2006. However, the Climate Group, the International Emissions Trading Association (IETA) and the

World Economic Forum plan to launch the final version of VCS in 2007. The VCS aims to **provide a credible but simple set of criteria that will provide integrity to the voluntary carbon market and underpin the credible actions that already exist.** The standard creates a basic “quality threshold” in the market. A goal for the VCS is for it to co-exist with other standards and “reinforce those that are robust and already exist (e.g. WBCSD/WRI GHG Protocol for Project Accounting, Gold Standard, and CCX). Credits certified via the VCS are then called Voluntary Carbon Units (VCUs).

Table 2.1 presents the main characteristics of VCM standards that have been presented in the above sections..

	Description	Focus on Env. & Social Benefits	Reporting/ Registration	Certifica'n Logo?	Includes LULUCF Method'y?	Geographical Reach	Start Date
Gold Standard	Certification for offset projects & carbon credits	Yes	VER registry in development	Yes	RE & EE projects	International	1 st project validated 2006, 1 st credits verified 2007
The VCS	Certification for offset projects & carbon credits	No	Use Bank of New York; other registry TBD	Yes	Yes, Methodologies TBD	International	Expected mid-2007
Green-e	Certification program for offset sellers	No	Registry Incorporated	Yes	Accepts other standards that include LULUCF	Aimed at N.A., International possibilities	Expected mid-2007
CCB Standards	Certification program for offset projects	Yes	Projects on Website	Yes	Only LULUCF	International	1 st project certified in 2007
CCX	Internal system for CCX offset projects & CCX carbon credits	No	Registry Incorporated w/ trading platform	No	Yes	International	2003
Plan Vivo	Guidelines for offset projects	Yes	No	No	Community based agro forestry	International	2000
Climate Neutral Network	Certification program for offset sellers & carbon neutral products	No	No	Yes	Yes	Primarily North America	1 st project certified 2001
Greenhouse Friendly	Certification program for offset sellers & carbon neutral products	No	No	Yes	Yes	Australia	2001
WBCSD/WRI Protocol	A set of guidelines for projects & corporate GHG accounting	No	Does not include registry	No	Protocol created For LULUCF	International	2001
CCAR	A Registry Protocol	No	Reporting protocols used as standards	No	Yes, first protocol	Currently California	1 st protocol in 2005
VER+	Certification program for offset projects, carbon credits & carbon neutral products	No	TÜV SÜV Blue Registry	Yes	Includes a JI or CDM meth's	International	Expected launch mid-2007
ISO 14064	Certification program for emissions reporting offset projects, carbon credits	No	No	No	Yes	International	Methodology Released in 2006
VOS	Certification for offset projects & carbon credits	No	TBD	No	Follow CDM or JI meth's	International	TBD
Social Carbon	Certification for offset projects & carbon credits	Yes	Creating its own registry system	Yes	Reforestation & Avoided deforestation	South America & Portugal	1 st Methodology applied in 2002
DEFRA	Proposed consumer code for offsetting & accounting	No	Does not include a registry	No	Follow CDM/JI standards	UK	TBD

Table 2.1: Main characteristics of well known VCM Certification Programs/ Standards available (source: Report of *New Carbon Finance* and *The Ecosystem Marketplace* on “State of Voluntary Carbon Markets 2007”)

2.2 PRESENT USE OF STANDARDS AND CERTIFICATION, VERIFICATION PROCEDURES

Following the presentation of so many existing and forthcoming standards it is worth considering which of them are used and at which percentage of the market. In accordance with the Report entitled: “Picking up Steam” of *New Carbon Finance* and *The Ecosystem Marketplace* on State of Voluntary Carbon Markets in 2007, the following allocation has been identified and presented in Figure 2.1.

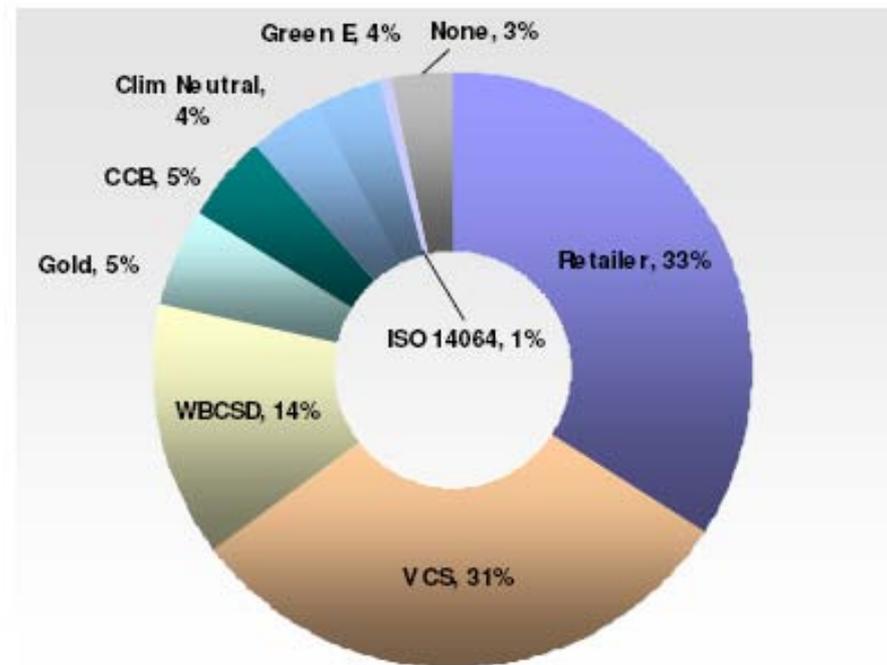


Figure 2.1: Used type of VCM standard in 2006 (source: Report of *New Carbon Finance* and *The Ecosystem Marketplace* on “State of Voluntary Carbon Markets 2007”)

The survey carried out shows that retailer specific standards, representing 33% of the market, were the most used type of standard. The next most popular was the VCS at 31% followed by the WBCSD representing 14% of cases. The share of ISO 14064 is negligible at present representing only 1% of the offset projects certified.

As far as which of future standards are considered to be the most appropriate for the needs of VCM stakeholders, 38% of respondents cited interest in the Voluntary Carbon Standard (VCS), 20% cited interest in the Voluntary Gold Standard, and 12% of respondents

noted particular interest in CCB standards. The remaining 30% cited Green- e standards, ISO 14064, Social Carbon and VER+ as possible future standards of interest. Many indicated that they are currently evaluating all upcoming standards and will adopt a suitable standard at a later date.

With regard to the type of verification processes used in 2006, the results from 40 organizations with combined 2006 sales of 9 mil tCO₂eq are shown in Figure 2.2. The overwhelming use of third party verifiers rather than the customer's and seller's own verification procedures should be illustrated. The situation is clearly related to the need for independent scrutiny of the projects generating the offsets.

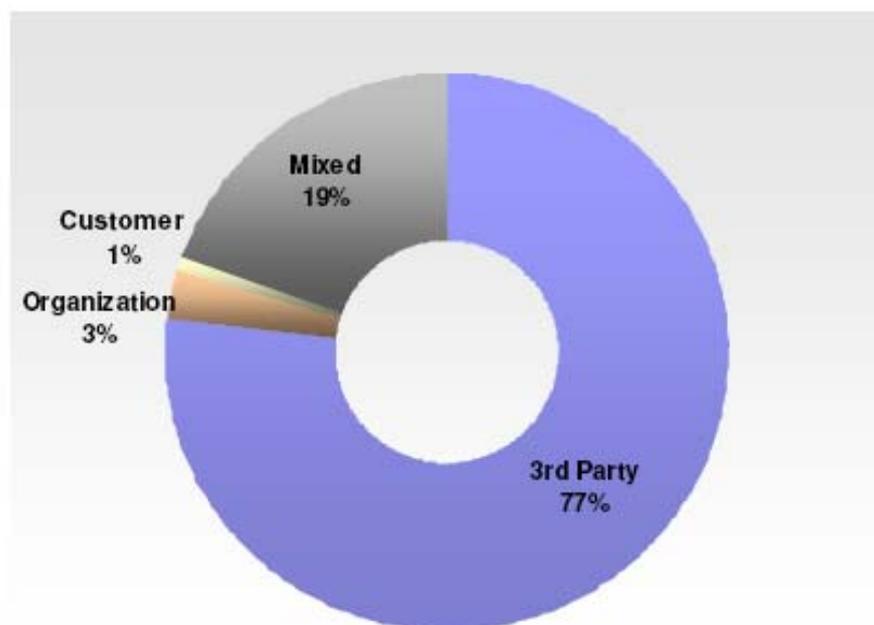


Figure 2.2: Type of verification process used in 2006 (source: Report of *New Carbon Finance* and *The Ecosystem Marketplace* on “State of Voluntary Carbon Markets 2007”)

2.3 REGISTRIES IN VCMs

In addition to standards, verification, and certification systems, there is another much-needed tool for the VCMs, which can keep track of credit ownership and eliminate double-counting or double-selling. These are registries that are well known from the organisation of compliance carbon markets.

Within the context of greenhouse gas emissions reductions, the term **registry** encompasses a range of definitions and ideas. In general, there are two categories of registries: Those in the first category track greenhouse gas emissions and/or emissions reductions, while those in the second category are actually carbon credit accounting systems.

Gas Emissions, Emissions Reductions Registers

For the purpose of this project, we are particularly focused on those registries that serve as credit accounting systems. However, in several cases, especially in the US, VCM actors use government-based emission/emission reductions registry programs as a means of publicly accounting for their project-based emission reductions and sequestration. Emission-reduction registries that account for project-based reductions include the US Department of Energy's 1605 (b) program, and the California Climate Action Registry. While these registries may not have been originally designed to account for carbon credit transactions, they have proved useful both as a way of acknowledging early actions and in creating systems for measuring project based emissions reductions.

Credit Accounting Registers

Within the context of carbon credit accounting, there are a range of registries embodying varied characteristics. Registries are initiatives in a variety of sectors, including government, non-profit, and private sector. Some are **independent** and others are **associated with carbon credit sellers, standard programs, or verifiers**. For example, the Chicago Climate Exchange registry was created to underpin the CCX cap-and-trade exchange. The Bank of New York registry was created as accounting tool to ensure secure, private VCU transactions. Alternatively, the California Climate Action Registry was created primarily to give credit for early action in emissions reductions.

In each of existing examples, registries of VCM account for credits resulting from offset projects as well as credit transactions. This is important because in any given year a project developer may have actually verified and registered significantly more or less credits than it sold.

3 THE ROLE OF OFFSETS IN VCM

Offsets that incorporate projects reducing carbon emissions is a well known mechanism used in VCM. Offsets do not take place in the interior of the VCM participating company or organisation, but in sites of third countries usually. It is used as an additional means of reducing GHG emissions, since priority should be given to internal cutting of emissions. This principle is not often adopted for many reasons, among which high cost of internal interventions and technical obstacles in implementing carbon reducing policies are the most significant. In theory, voluntary offsetting could be undertaken in addition to cutting emissions. For example a public body or company could be on track for making emission cuts in line with a national target by 2020, and choose to offset their remaining emissions whilst doing so. However, the reality of offsetting is that it is used as an excuse to continue emitting.

Actually there is a plethora of strong views as to the purpose and significance of the voluntary carbon offset market in reducing carbon emissions. At one end of the spectrum, carbon offset schemes are a dangerous distraction from generating public support for policies that will help avoid climate crisis and lead the way into a swift and just switch to low-carbon economies. It is nonsensical to suggest that climate change can be tackled by cutting emissions from poor people, whilst allowing activities of the rich, such as flying, to continue unabated. Yet this is the basis on which offsetting projects in developing countries are supposed to work. Those opposed to offsetting stress that the concept of offsetting itself is incoherent, that the claim of equivalence between emissions and offsets is rooted in the technical requirements of the market rather than science. Making a chemical plant more efficient is not the same as supplying efficient light bulbs to Kenya. They also argue that there are unsolvable measuring and accounting problems and that the technicalities and jargon of carbon offsetting present an obstacle to public debate.

At the opposite end of the spectrum, rather unsurprisingly, offsets make a significant contribution to the fight against dangerous environmental change driven by global warming. Real reductions in carbon emissions in a cost effective way are delivered and that, by taking a market driven approach, the implementation of innovative solutions to the problem of reducing carbon is so encouraged.

Therefore, offsetting cannot be avoided in a VCM which broadly fosters reduction of carbon emissions. The arguments and consultation about the organisation of offset transactions and proper market design are necessary to ensure minimisation of related problems.

High quality carbon offsets must clearly demonstrate **additionality**, **avoid double counting**, have a **realistically calculated baseline** and emissions reduction projection, account for leakage and be permanent.

3.1 ADDITIONALITY

The topic of additionality answers a very simple question: “Would the project have happened anyway?” If the answer to that is yes, the project is not additional.

For example, I buy carbon offsets means that I make the implicit claim that I forgo reducing my own emissions (i.e. I still fly) but in exchange I pay someone to reduce their emission in my stead. If I buy carbon offsets to neutralize the emissions I caused during air travel from someone who would have reduced his emissions anyway, regardless of my payment, I, in effect, have not only wasted my money, but I also have not neutralized my emissions. It is not necessary that the project is happening solely because of the carbon credits it produces but the anticipated benefits of the carbon offsets have to be a decisive factor for pursuing the project.

What makes additionality so difficult an issue is not its theoretical definition, but its application in practice. In fact, there is no way to determine with absolute certainty if a project is additional or not. Instead, many different additionality tests and eligibility criteria have been developed to maximize the accuracy of additionality evaluation.

Also, additionality tests are always to some extent subjective, because the assumptions that underlie even the strictest additionality test are determined by the objectives that the additionality test is trying to fulfil. These objectives cannot be scientifically determined or tested, because they are not technical but political in nature and must therefore be discussed and standardized by policy makers.

It is never possible to establish with certainty what would have happened in the absence of a particular project, and clearly there is potential for abuse. For example, there are strong financial incentives for the seller (project financier and implementer) as well as the offset buyer to overestimate the “business-as-usual” baselines and thus artificially inflate emission credits for improved performance. There is clearly a need for strict monitoring and third-party verification of carbon projects. Although the risks of “cheating” are real and substantial, it is also important to recognize that additionality rules that are too stringent can hamper project implementation.

In this context of VCM operation, voluntary offset companies must deal with these difficulties to some degree when choosing projects. It is usually the certification and verification organizations that ensure additionality.

3.2 DOUBLE COUNTING

Unfortunately, it is too easy to double count emissions reductions; that is, to have multiple stakeholders take credit for them. Some of these double counting issues are easily addressed:

- Offset companies must retire their offsets once they sell them (i.e. they can only be sold once).
- Offset companies must ensure that carbon offsets from renewable energy projects are not also sold as Green Certificates.

Other double counting issues are more difficult to address. For example, if an EU company were to buy offsets that are invested in a wind farm project in Canada, he will take credit for these emissions reductions. But Canada will also count the resulting reduction in carbon emissions from the new wind farm toward its emission reductions goals that they are required to meet as signatories of the Kyoto protocol. This means, not only are the emissions double counted but the wind farm has effectively replaced another set of emissions reduction measures that Canada would have had to take in order to meet its Kyoto requirements. Viewed this way, it can be argued that the wind farm does not have any net carbon benefits.

This type of national double counting problems could be addressed if Annex 1 countries with emissions reduction obligations would retire AAU credits for all the VERs that are created through the voluntary market. At present none of the countries has such regulation in place.

Double counting issues also apply on a more local level: if a region, state, county or city has enacted an emissions reduction target – even if it is just a voluntary one – any emissions that are created in that area but then sold as VERs in the voluntary market must not also be counted in that jurisdiction's emissions inventory.

However, it is estimated that double counting on a national level is actually not a problem, but more localized double counting problems and international transfers of VERs remain an issue. To solve this problem an international registry for VERs (similar to that

which exists for CERs created by CDM projects) is needed to minimize fraudulent double counting.

3.3 TYPES OF OFFSET PROJECTS

Companies invest in a variety of different carbon offset projects. Most projects can be broadly categorized into three main well known types, as it is expected:

- renewable energy,
- energy efficiency and
- sequestration projects.

These three categories are presented in more detail below. Projects that do not easily fit into one of the three main categories include projects that reduce non-CO₂ emissions, like:

- Flaring of landfill gas, which consists of about 50% methane. The greenhouse effect of methane is estimated to be 21 times higher compared to the relevant effect of same quantity of CO₂.
- Reducing emissions from industrial processes, thus by altering production processes GHG emissions are ameliorated.
- Other specific cases in the areas of reducing NO_x, substituting cooling cycle gases, etc.

3.3.1 Renewable Energy

Numerous renewable energy technologies exist. Most offset projects focus on Small hydro, wind, biomass, and solar technologies. Examples of such projects could be mentioned:

- photovoltaic panels to create electricity for a home or a village in a developing not fully electrified country,
- construction of a wind farm connected to the network,
- use of biogas production devices to supply small agro-industrial enterprises,
- exploitation of water streams for electricity generation consumed at local or national (connection to the grid) level, etc.

Economic, geographic, social, and political factors all need to be considered to establish the feasibility of renewable energy projects. Most renewable energy projects require high capital costs, although they may offer high rates of return. Legislative hurdles and local opposition to a project can further complicate the implementation of such projects.

Projects that are implemented in poorer nations are often much more cost effective but such projects can easily be compromised by a lack of local capacity and the needed infrastructure to operate the new technology. Project staff may introduce the new technology and then leave the project site without creating a sustainable situation under which the new technology can be maintained and repaired.

Nevertheless, it is of utmost importance for GHG reduction and the long-term protection of the global climate, to encourage moving away from fossil fuel based electricity production to renewable energies.

3.3.2 Energy Efficiency

Energy efficient products or systems use less energy to perform the same task. Typical examples of energy efficiency technologies compact florescent lamps, energy efficient motors, and redesigned cooking stoves. Installing more efficient stoves in developing countries can reduce coal and wood consumption. Improving efficiency of wood use is particularly important in areas where wood harvesting contributes to deforestation.

Establishing a baseline can be difficult, for example, reducing the amount of wood burned does not result in a net greenhouse gas reduction: the burning of wood is considered carbon neutral since the carbon released is equal to the carbon the tree absorbed. Yet, if there is permanent deforestation as a result of fire wood use, more efficient stoves can reduce CO₂ emissions.

Energy efficiency projects need to be carefully evaluated for their economic, environmental and social benefits. In developing nations, new technologies need to be introduced alongside building the necessary local capacity to make the projects sustainable. Energy efficiency projects, in the areas of energy management, good housekeeping and small investments, have higher transition costs than large centralized projects, because they are small and decentralized. Transition costs include planning, installation, operation and maintenance. However these projects are of rather lower cost and are addressed to big number of consumers with positive social effects.

Because of the decentralized nature of most of low cost energy efficiency projects, monitoring and evaluating energy efficiency projects can be challenging. Establishing a baseline and estimating emissions reduction for small decentralized projects is difficult and labour intensive.

Despite the issues that can arise with energy efficiency projects, such projects have great potential in decreasing greenhouse gas emissions. Well implemented energy-efficiency projects are among the best offset projects.

3.3.3 Biological Sequestration

Biological sequestration absorbs CO₂ emissions through the growth of vegetation. Bio-sequestration projects, usually called Land Use, Land Use Change and Forestry (LULUCF) projects are the most controversial of the three main types of offset projects. The amount of carbon sequestered by vegetation depends upon a number of factors including the age of the trees, their growth rate, local climatic conditions and soil conditions. Additionally, the carbon intake may be altered over time as temperatures and carbon dioxide concentrations in the atmosphere change with global warming. While greater concentrations of carbon dioxide may increase the growth of trees, greater cloud cover can reduce light and thus limit growth. Additionally, photosynthesis is reduced when temperatures are above optimal levels.

Carbon sequestration should not be seen as a long-term solution. Predictions state that only 10% of human emissions over the next 100 years can be offset by forests.

One of the largest challenges that arise with carbon sequestration is measurement. The carbon cycle in trees is complex. During the day, plants synthesize carbon dioxide yet at night and under stress situations (e.g. drought and heat) the process reverses and plants respire CO₂. Furthermore, the carbon cycle is altered by seasonal changes in temperature and precipitation. Additionally, leakage must be considered to properly measure project benefits. Leakage is the unanticipated loss of carbon reductions. For example, farmers may be moved off a given plot of land to allow a project to plant trees for sequestration, but the farmers may clear trees in another location to begin farming there. Thus the project may not be able to claim a net reduction in carbon emissions.

A final issue concerning measurement is permanence. For a LULUCF project to realize its full potential of sequestration, it must last. There are two main ways that the benefits could be negated.

First, natural events such as fires, pests, or diseases could destroy a forest. Second, the forest could be cut down by human activity.

Additionally, the age of the forest impacts carbon uptake; young forests absorb more carbon than older ones but mature forests store more carbon per acre in trees and soil and their biological value is also much higher. A tree plantation that is harvested at relatively short intervals and then replanted can have a high rate of carbon sequestration. Yet, while such a system of monoculture may have high carbon benefits, its ecological value is low, specifically in terms of biodiversity.

Ultimately, the exact tons of carbon sequestered might be less important than considering which projects help the transition to a low carbon economy. Both energy efficiency projects and renewable energy projects promote a more efficient, lower carbon economy, while LULUCF projects constitutes at best a stop gap measure that might ensure the protection of valuable biodiversity in old growth forests, at worst it can negatively impact biodiversity and also hamper the development opportunities of poor subsistence farmers in developing nations.

Clearly, land use management and reforestation projects are vitally important to protect and restore watersheds, ensure clean drinking water and protect biodiversity. Yet it is worth considering that such projects should be implemented to secure exactly those benefits and not to achieve carbon sequestration. Therefore, the inclusion of LULUCF projects in VCM should take place under fulfilment of specific conditions; otherwise it is better to concentrate on renewables and energy efficiency projects.

3.4 OFFSET PROJECT LOCATION

All countries have a responsibility to reduce their emissions, yet the weight of responsibility lies with the developed nations who are not only historically responsible for the largest part of emissions, but also have the highest per capita emissions. It can therefore be argued that developed nations have a moral obligation to take the lead in cutting their domestic emissions. Thus, it is of utmost importance that VCM may favour domestic projects that support the domestic economy also.

Projects in developed countries are often not as cost-effective to implement as projects in developing countries. Large-scale domestic projects, such as wind farms, are susceptible to high upfront costs and political hurdles. However, technical know-how and

verifiability of projects are easier to establish domestically than in a developing nation.

On the other hand, offset projects for VCM implemented in developing countries have actually to compete with CDM projects of the Kyoto Protocol flexible mechanism. Therefore, it is not an easy task to find project opportunities that could not be exploited through other international initiatives. In this context, the VCM rules could encourage or discourage contribution of such project offsets either by placing quotas or by enforcing strict standards.

Yet there are also some drawbacks to domestic projects implemented in more developed Annex 1 countries. Some of the issues involving double-counting and the risk that voluntary offset projects just replace other carbon mitigation measures which would have had to be implemented in order for the country to meet its Kyoto obligations.

Also, aside from large renewable energy projects, voluntary domestic carbon projects are often small-scale and should be organised as sets of projects or intervention programs. Otherwise, the small size means that the change they facilitate is marginal and does not facilitate more comprehensive policy change.

The advantages and disadvantages of projects in developing countries depend very much on how projects are designed and implemented. Because there are also major concerns with projects implemented domestically, it should be stressed as very important to focus on projects that can prove clear additionality, sustainable development benefits, permanence, and contribute to the long-term goal of a carbon free, highly energy efficient economy.

4 ORGANISATION OF A NATIONAL VCM

Following the present experience from the active VCMs and the problems they face we could proceed to present the main issues that a new initiative in this sector should consider. International experience exists and in a few words concludes that institutions buying and selling voluntary carbon offsets face a fragmented market, a complex supply chain, and a lack of consistent standards. Each new 'climate neutral' product offering or company seems to employ a different business strategy for achieving its carbon goals, while carbon credit providers source offsets through an array of projects that range from planting trees in Australia to installing solar systems in Bangladeshi villages to capturing methane in American landfills. Hence, the market operates under the principle of “let the buyer beware”.

There are signs, however, that the market is beginning to consolidate around a few guiding practices and business models from which conclusions can be drawn about market direction and opportunities.

Institutions and individuals acquire offsets in a number of ways, but a simplified model of the **VCM's supply chain** includes the following elements:

1. a project or project idea is generated,
2. the resulting emission reductions are verified to some standard to create carbon credits,
3. the credits are sold to middlemen, and
4. the middlemen sell them on to businesses and individuals.

This simplified market model is presented in Figure 4.1.

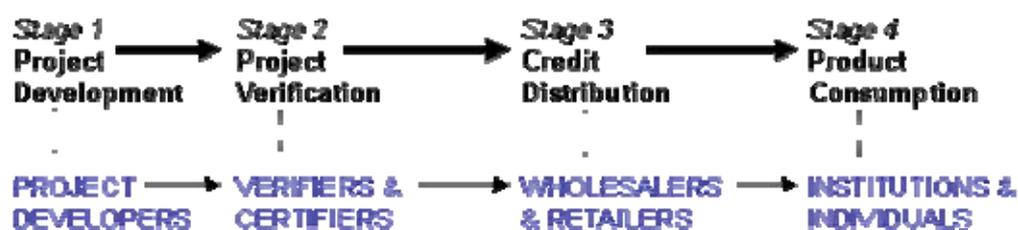


Figure 4.1: Simplified supply chain of the VCM (source: Voluntary Carbon Markets, R. Bayon, A. Hawn, T. Work)

Brokers and exchanges may assist in the distribution of offsets by facilitating transactions between buyers and sellers, but they usually do not buy or sell credits.

In some cases, project developers may skip stage two and/or three of this sequence, selling either verified or unverified credits directly to consumers.

4.1 PROJECT DEVELOPMENT

In most cases, project development is the first step in the supply chain for carbon credits destined for the VCM. It is worth noting, however, that some projects start simply as a concept or idea and may not begin until a buyer supplies funding. In theory, a single landowner might develop a project on his or her land and sell the resulting offsets directly to a buyer.

In practice, project developers are usually:

- non-profit organizations interested in combating climate change and/or contributing to sustainable development;
- private companies that are uniquely positioned to develop projects;
- small private-sector companies that have been set up in response to the carbon market; or
- public sector agencies interested in seeding the market.

The conclusion, then, is that project developers come in all stripes and sizes.

One differentiating factor is project size. CDM definitions illustrate the range of projects in the compliance and voluntary markets and categorize projects as 'small' or 'large.' CDM projects that generate less than 15,000 tCO₂eq annually are placed in the small project category and all others are placed in the large project category. The majority of project developers prefers to be involved in large projects that have dominated the regulatory and voluntary markets to date. The World Bank reported that, 'From 2004 to 2005-06, the average transaction size increased from 1.24 million tCO₂eq to 1.90 million tCO₂eq' for all project-based transactions (i.e. transactions in both voluntary and regulatory carbon markets). Through economies of scale, large projects often reduce transaction costs per credit,

result in more GHG mitigation, and give rise to lower prices and higher profits.

4.2 PROJECT VERIFICATION AND CERTIFICATION

Verification, the second stage in the supply chain, begins the life cycle of creating a product recognized by the market. The term Verified Emission Reductions (VERs) - sometimes used as a de facto currency in the voluntary carbon market - embodies the ideal of legitimate third party verification. Quantifying and verifying GHG emission reductions requires significant technical expertise, and monitoring throughout the project life span.

A wide variety of accounting methods are used to establish carbon credits in the voluntary market. Some are self developed by project managers and others by a third-party verifier.

Co-benefits range dramatically between project types, but are an important factor for many institutions purchasing emissions voluntarily. Co-benefits may also represent additional revenue streams for investors. Electricity sales, sales of other pollution credits or timber all represent financial co-benefits. It is important, however, that customers understand which co-benefits have been parceled off and which will remain 'bundled' with the carbon offset.

Most project developers finance the verification of their carbon emissions reductions before selling them to either middlemen or end-consumers in the voluntary market. In general, buyers prefer third-party verification to in-house verification for reasons of credibility.

When a project's offsets have been verified in accordance with a particular set of certification standards and endorsed by the organization issuing the standards, it is common to say that the resulting carbon credits have been certified. Certification in the voluntary market is a more general term suggesting that an institution with a recognized set of standards has endorsed the credits in question with a stamp of approval.

Certification could be an extremely beneficial tool to ensure a consistent level of quality, reduce transaction costs for buyers and build consumer trust. To date, however, discord surrounding the large number and variety of certification programs in the market has caused some confusion among buyers.

4.3 CREDIT DISTRIBUTION

Retailers and carbon fund managers generally select and maintain investments in a portfolio of projects that generate credits over time. Credits thus have vintage years denoting the year in which they were generated. For example a project that started in 2005 and will last for three years may be able to sell credits for 2005, 2006 and 2007 vintages, or in bulk for the lifespan of the project (for example purchasing a tree that will offset emissions over its 70-year lifespan).

4.3.1 Retailers

An international survey of retailers, by the HWWI Research programme on Climate Policy, estimated that there were about 30-40 retail providers (some for-profit, some not-for-profit) in the world in 2005. Most retailers work on a 'pay-as-you-go' cycle in which they maintain a small inventory of credits and 'top up' when new clients provide funding.

While a retailer's project portfolio may change over time, its transparency to consumers, together with the stringency and standards it uses when selecting projects, is what allows for product differentiation. Project portfolios often include energy efficiency, renewables projects and sequestration projects, but it is worth noting that many retailers choose to work only with one or the other category. Of those that work with both, research in late 2005 suggests that typically 80 per cent of credits are from emissions reductions projects and 20 per cent are from sequestration projects.

4.3.2 Investors

Unlike the regulated or compulsory carbon markets where institutional investors abound, few funds currently invest in the voluntary carbon market. The funds usually seek out and manage high quality offsets for CO₂ emissions for large-scale corporate and institutional buyers. Climate Wedge may be the first of many hedge funds and other capital market tools to bring major speculative investment into the voluntary carbon market.

4.3.3 Brokers

Brokers work to facilitate transactions between institutions and offset project developers. Most frequently, brokers match buyers and sellers for CERs purchased under the CDM; however in the voluntary market they can also provide trading services for VERs. Brokers

generally charge a commission of roughly 7.5 per cent for their services.

4.3.4 Exchanges & Registries

Currently, the Chicago Climate Exchange (CCX) is the only exchange trading voluntary carbon credits, and access to the exchange is restricted to members.

The Bank of New York announced in June 2006 that it has created a registry service for corporate buyers and sellers who wish to trade voluntary carbon credits via a 'centralized, secure and paperless environment.' The registry and a team of employees to support it will be based within the Bank's corporate trust services division.

Several government agencies have stepped in to provide registries for credits generated by voluntary offset projects. The United States Department of Energy, for instance, has a National Voluntary Reporting Greenhouse Gases programme, established by Section 1605(b) of the Energy Policy Act, which is a public database that 'provides a means for organizations and individuals who have reduced their emissions to record their accomplishments and share their ideas for action.' Organizations can report direct emissions reductions or offset projects, such as sequestration activities. Similar to the national 1605 (b) Voluntary Reporting programme, the state of California created the California Climate Action Registry (CCAR), a non-profit voluntary registry for emissions reductions. Sequestration activities, but only forestry projects, can be recorded in the registry.

4.4 CREDIT DEMAND

Consumers in the voluntary carbon market may make a one-time purchase, or they may choose to work with a middleman in an ongoing relationship, receiving credits from a project or a portfolio of projects year after year. In general, carbon credits are consumed in order to offset one of four types of emissions:

- **Internal emissions:** Companies, non-profit organizations or government agencies may purchase carbon credits in order to offset the emissions generated by their facilities and employees in the course of doing business, such as emissions from travel, energy use, manufacturing etc. These emissions are often referred to as direct emissions or internal emissions, and this type of deal probably accounted for most of the carbon credits purchased on the voluntary carbon market at present.

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- **Product life cycle emissions:** Companies, to date, have been less willing to offset the emissions generated by the use of their products (known as their indirect or external emissions), but market observers expect this may change in the coming years as companies buy credits in order to develop carbon-neutral products for their customers. Such products generally carry a price-premium and are marketed as carbon neutral in much the same way that organically produced food products are marketed as environmentally sound. Theoretically, companies could purchase offsets in order to offset their external emissions as a matter of corporate social responsibility without using them towards the certification of carbon-neutral products, but this is less likely since most companies will capitalize on a marketing opportunity when and where possible. While the use of carbon offsets to create carbon-neutral products has been limited to date, market observers expect this form of offset consumption may one day become a staple of the voluntary carbon market.
 - **Event emissions:** In recent years, steering committees for high-profile events have elected to take events carbon-neutral through the purchase of large numbers of carbon credits. As credits become more readily available and certification programs gain more trust in the coming years, offsetting event emissions may become common practice for many political, athletic and social events.
 - **Individual emissions:** In contrast to the first three types of carbon credit purchases, which involve an institutional buyer purchasing large numbers of credits, the last kind of deal involves individual consumers purchasing carbon credits in order to offset their daily activities and/or travel plans. While this side of the market is small at the moment, many social sector organizations consider it the most important type of transaction, since it allows individuals to take action against climate change, thus increasing public awareness of the market.

4.5 MARKET DRIVERS AND OPERATION MODUS

It is very important to make oblique reference to market drivers that are:

- the risk of future regulation,
- a desire for product differentiation,

- philanthropic aims, etc.

While organizations tend to offset events, activities or products via offsets purchased from retailers, major corporate commitments to carbon neutrality generally skip this step and work directly with project developers. A simplified view of this activity is presented in Figure 2.2. Some of these interactions are managed through brokers. Theoretically, brokers may connect all kinds of buyers and sellers at any point in the supply chain bearing credits to market. In reality, brokers very rarely work with individual consumers, who almost exclusively purchase offsets from retailers or from project developers retailing their own credits.

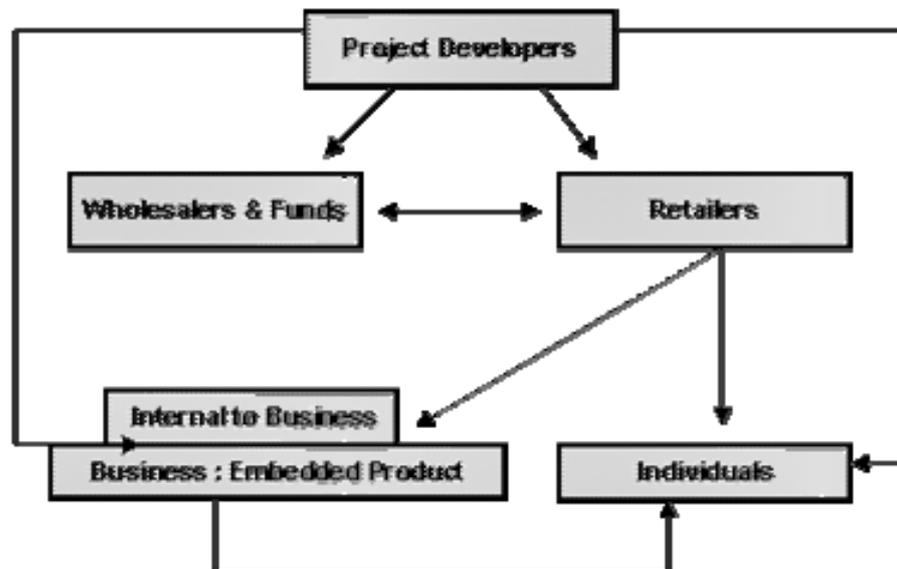


Figure 2.2 Common types of transactions in the voluntary carbon market (source: Voluntary Carbon Markets, R. Bayon, A. Hawn, T. Work)

As previously discussed, a growing number of businesses also offer embedded carbon neutral products to end-users. Businesses can brand products as carbon neutral (either maintaining their own branding or using a certifier's branding), which ensures to customers that emissions in the product's life cycle have been offset.

Both for-profit and not-for-profit institutions act as middlemen. At the coarsest level, it is fair to say that for-profit middlemen acting as wholesalers or retailers of carbon credits are driven by profit motivations, while their not-for-profit counterparts are generally driven by environmental and sustainable development aims. It should be noted, however, that many of the for-profit organizations operating within this sphere also have philanthropic aims, but believe that a private-sector model provides the most sustainable vehicle for driving change.

Within the consumers' category, one can further separate buyers into institutions and individuals. And within the institutions category, it is possible to distinguish between buyers from the private, public and social sectors.

Since it is the purchasing behavior of end-consumers that ultimately drives the market, we will look at the motivations that individual and institutional consumers have for buying carbon credits on the voluntary carbon market.

4.5.1 Individual consumers

Against this backdrop, it is hardly surprising that research suggests individual consumers of carbon credits on the VCM are driven primarily by the sense that addressing climate change is the right thing to do. In the US, retailers of carbon credits say the top reason consumers cite for buying carbon credits is a desire for independence from oil. In the UK and the rest of Europe, consumers say sustainable development concerns top the list of motivations for purchasing credits. A recent study shows that 40 per cent of European voluntary carbon purchasers would pay a premium for carbon obtained from projects with either environmental or sustainable development benefits.

4.5.2 Private sector institutions

In the absence of regulation, financial lenders and shareholder groups are pushing businesses in the US, Australia and Canada to develop strategies for managing their carbon footprint. Similarly, European companies that do not fall within the sectors currently regulated under the EU ETS are feeling increasing pressure to act on climate.

The Carbon Disclosure Project (CDP), for instance, was launched six years ago by a global group of institutional investors to pressure businesses to report on their carbon emissions footprint and what they were doing to manage it. The project sends out a survey to the world's largest companies and then publishes their responses on its website. The project also publishes a list of those companies failing to respond.

In general, corporations cite five reasons for participating in the voluntary market:

- experience and clout as a way to influence future regulatory requirements and policy setting,
- preparation for potential regulatory requirements,

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- competitive differentiation as consumers become increasingly concerned about climate change, including being able to offer products that are carbon neutral,
 - inclusion in company-wide corporate social responsibility or sustainability strategies,
 - better access to capital by helping attract investment and secure project finance,
 - ability to recruit, retain, and reward staff because of 'good actor' perception.

4.5.3 Public sector institutions

Governments at the local, regional and federal level have all emerged as voluntary buyers of carbon credits. For example, the cities of Chicago, Oakland, Berkeley, Portland, and Aspen in the US have joined the Chicago Climate Exchange. In Australia, the states of New South Wales and Victoria have both said they will invest in offset projects in order to offset their emissions. And the UK government recently announced it would buy carbon credits in order to take all of its operations carbon neutral.

What's driving these decisions? Public sector institutions probably have two main reasons for entering the voluntary carbon market as buyers:

- they are interested in advancing the market as a means of attracting private sector capital toward costly environmental problems; and
- they sense their constituency's desire for action on climate change and so want to be seen as leading by example.

Of these, the latter is probably the most important.

4.5.4 Social sector institutions

Non-profit institutional buyers are driven by the importance of 'walking the talk,' public relations, and philanthropic aims that range from ecological restoration to sustainable development. There are a number of environmental organizations that believe markets provide a promising new approach to conservation finance. There are also a number of corporate foundations, universities and political organizations, both national and international, which have taken it upon themselves to seed the VCM by stepping in as buyers of carbon credits. The key driver of demand among these buyers, then, is the degree to which they believe the market can drive environmental and social benefits.

4.6 PRICE TRENDS

Since many of the transactions in the voluntary carbon market occur over the counter (bilateral contracts) and many buyers and sellers guard price information closely, it is difficult to get a bearing on the wholesale price of carbon credits.

Broadly speaking, prices can be compared at two levels: the cost of the offset project and the market price of the credit sold. Project cost is influenced by three major factors:

- technical reduction costs, influenced by factors such as project type, size, location, upfront costs vs. length of return, profits from co-benefits and additionality,
- transaction/administration costs, and
- seller's profit.

Market price is also influenced by several factors. For example, steps between the project and the buyer such as brokers, retail sellers, verification, certification and marketing may increase the price. Similarly, like many commodities, price often varies according to the scale of the purchase. Prices will also evolve in the voluntary market with changes in supply and demand. For example, regulation of VCM initiating standardized requirements could increase the price of carbon credits.

Importantly, since the attributes contributing to credit quality are only one of the factors influencing price, 'better' credits and higher prices do not always correlate. Generally, low additionality credits, which have little environmental value, cost less than other types of credits, since only the transaction costs involved with claiming the credit contribute to its expense.

From the wholesale to the retail level, voluntary credits can be found for prices ranging from less than \$1.00 to as much \$35.00. At the retail scale, a low price credit from a large-scale project can be purchased for around \$4.25, while a low price credit from a smaller scale project runs at about \$10.00. According to the World Bank, consumers paying the highest prices for voluntary carbon credits consistently express a willingness to pay for sustainable development benefits.

4.7 MARKET TRENDS

Some investors think that, as regulation comes online in the US and more sectors are included in the EU ETS, voluntary carbon credits

will see a jump in value not unlike that experienced by CDM credits once the Kyoto Protocol went into effect.

For the most part the drivers of the voluntary carbon market look set to grow in the coming years, but it should be remembered that the market is far from mainstream at this point and uncertainty abounds. Fortunately, registries, standards and exchanges are evolving to help streamline the voluntary carbon market and consolidate market information as potential buyers push for increased transparency. It should become easier, then, for buyers and sellers to grasp both the risks and the opportunities associated with this dynamic market in the coming years.

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