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Making Sense of the Voluntary Carbon Market

A Comparison of Carbon Offset Standards

Anja Kollmuss (SEI-US), Helge Zink (Tricorona), Clifford Polycarp (SEI-US)



Agricultural waste collection for CDM bio-mass project Malavalli, India.

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About This Report

This report discusses the role of the voluntary carbon market and provides an overview of the most important currently available carbon offset standards. It compares the following standards side-by-side, outlining the most pertinent aspects of each:

- Clean Development Mechanism (CDM)
- Gold Standard (GS)
- Voluntary Carbon Standard (VCS)
- VER+
- The Voluntary Offset Standard (VOS)
- Chicago Climate Exchange (CCX)
- The Climate, Community & Biodiversity Standards (CCBS)
- Plan Vivo System
- ISO 14064-2
- WRI/WBCSD GHG Protocol for Project Accounting

The report is meant to be a comprehensive reference. To maximize the readability and transparency of the report, we distinguish between the following types of information:

- **Background information** describes principles and mechanisms of the offset market in general. This report uses the CDM as the baseline standard against which all the other standards are compared. It also includes an explanation of the CDM project cycle and the main actors involved in CDM offset projects. The information in these sections is presented as objectively as possible and with minimal editorializing. The appendices include further background information. *Background information appears in black.*
- **Standard Comparisons and Summaries** include specific information about each standard as well as comparison tables. The information in these sections is presented as objectively as possible and with minimal editorializing. *Standard comparisons and descriptions are titled in blue or on a blue background.*
- **Authors' Comments** are sections where the authors express their opinions and value judgments. Editorial comments and opinions about each standard can be found at the end of the standard description. In their brief comments, the authors focus on what they consider the main strengths and weaknesses of each standard. *Editorial comments are indicated by a vertical bar on the left.*

Many of the standards we have reviewed are young and have few implemented projects. Our assessment relies on comparing the requirements of each standard and does not include project comparisons. Judging the standards based on their performance in the real world will be impossible until at least a few projects have been implemented under each of them.

We hope that the layout and structure of this paper will allow a diverse audience of consumers, offset professionals and project developers to find the information they are looking for.

Executive Summary

In order to preserve a high probability of keeping global temperature increase below 2 degrees Centigrade, current climate science suggests that atmospheric CO₂ concentrations need to peak below 450ppm. This requires global emissions to peak in the next decade and decline to roughly 80% below 1990 levels by the year 2050 (Baer and Mastrandrea, 2006). Such dramatic emissions reductions require a sharp move away from fossil fuel, significant improvements in energy efficiency and substantial reorganisation of our current economic system. This transition can only be achieved by far-reaching national and international climate policies.

Carbon offsetting is an increasingly popular means of taking action. By paying someone else to reduce GHG emissions elsewhere, the purchaser of a carbon offset aims to compensate for – or “offset” – their own emissions. Individuals seek to offset their travel emissions and companies claim “climate neutrality” by buying large quantities of carbon offsets to “neutralize” their carbon footprint or that of their products.

Carbon offset markets exist both under **compliance schemes** and as **voluntary programs**. Compliance markets are created and regulated by mandatory regional, national, and international carbon reduction regimes, such as the Kyoto Protocol and the European Union’s Emissions Trading Scheme. Voluntary offset markets function outside of the compliance markets and enable companies and individuals to purchase carbon offsets on a voluntary basis (see chapter 2.2). With more than € 20 billion* traded in 2006 (Capoor & Ambrosi, 2007), carbon markets are already a substantial economic force and will likely grow considerably over the coming years. The voluntary market, although much smaller than the compliance market, (€62.6 million in 2006; Hamilton, 2007) is also growing rapidly.

This report discusses the role of the voluntary carbon offset market and provides an overview and guide to the most important currently available voluntary carbon offset standards using the Clean Development Mechanism (CDM) as a benchmark†. The report compares the standards side-by-side and outlines the most pertinent aspects of each. The evaluated standards are:

- Clean Development Mechanism (CDM)
- Gold Standard (GS)
- Voluntary Carbon Standard 2007 (VCS 2007)
- VER+
- The Voluntary Offset Standard (VOS)
- Chicago Climate Exchange (CCX)
- The Climate, Community & Biodiversity Standards (CCBS)
- Plan Vivo System
- ISO 14064-2
- GHG Protocol for Project Accounting

Carbon offset markets have been promoted as an important part of the solution to the climate crisis because of their economic and environmental efficiency and their potential to deliver sustainability co-benefits through technology transfer and capacity building. The voluntary offset market in particular has been promoted for the following reasons:

Possibility of Broad Participation

The voluntary carbon market enables those in unregulated sectors or countries that have not ratified Kyoto, such as the US, to offset their emissions.

* All monetary figures were converted to euros, using the exchange rate from Feb, 5, 2008 of 1 USD = 0.67 euros. Standard fees listed in USD were left unchanged.

† The terms *GHG offset standard* and *carbon offset standard* are used as synonyms.

Preparation for Future Participation

The voluntary carbon market enables companies to gain experience with carbon inventories, emissions reductions and carbon markets. This may facilitate future participation in a regulated cap-and-trade system.

Innovation and Experimentation

Because the voluntary market is not subject to the same level of oversight, management, and regulation as the compliance market, project developers are more flexible to implement projects that might otherwise not be viable (e.g. projects that are too small or too disaggregated).

Corporate Goodwill

Corporations can benefit from the positive public relations associated with the voluntary reduction of emissions.

Most importantly, voluntary and compliance offset mechanisms have the potential to strengthen climate policies and address equity concerns:

Cost-effectiveness that allows for deeper caps or voluntary commitments.

By decreasing the costs of reductions, offsets can in principle make a compulsory mandate more politically feasible and a voluntary target more attractive, thereby accelerating the pace at which nations, companies, and individuals commit to reductions.

Higher overall reductions without compromising equity concerns.

One of the greatest challenges of climate protection is how to achieve the deep global emissions reductions required while also addressing the development needs of the poor. Historically, developed nations have been responsible for a much larger share of the increase in atmospheric GHG concentrations than developing countries. But to achieve climate stabilisation, emissions must be curbed in all countries, both rich and poor. Offsets may be one way out of the conundrum of needing to achieve steep global emissions reductions while at the same time allowing poor nations to develop. This has not been the case thus far because the emissions reductions undertaken have been too small to be significant. Small reduction targets allow participants to tinker at the margins and avoid the kind of restructuring that is needed to achieve climate stabilizations. While taking on considerable domestic emissions reductions, industrialized countries could, through offsets, help finance the transition to low-carbon economies in developing nations. In other words, offsets might allow equity to be decoupled from efficiency, and thus enable a burden-sharing arrangement that involves wealthier countries facilitating mitigation efforts in poorer countries*.

Yet carbon offsetting is not without its critics. A recent flurry of media reports has criticised the poor quality of carbon offsets projects in both the compliance and the voluntary market (e.g. Financial Times, 2007). Recent research reports have pointed out that a significant number of offsets come from projects that would have been implemented anyway (i. e. are non-additional, see section 5.1) (Schneider, 2007; Haya, 2007) Critics have also raised concerns over equality and fairness based on the argument that carbon offsetting enables developed nations to perpetuate unsustainable lifestyles by funding carbon projects in developing countries. Some argue that these projects rarely lead to benefits for the host community, and have gone so far as to call the offset market a form of carbon colonialism (Eraker, 2000). Others assert that accounting methods for offsets are too inaccurate to justify claims of real emission reductions or to support the achievement of 'carbon neutrality'. The voluntary offset market in particular has been criticised for its lack of transparency, quality assurance and third-party standards.

To address these shortcomings, over a dozen voluntary offset standards have been developed in the last few years. Each standard has a slightly different focus and none has so far managed to establish itself as *the* industry standard. Some closely mirror compliance market standards, while others take

* For an in-depth analysis of such a potential climate and equity framework, see the *Greenhouse Development Rights Framework* (Baer et al 2007)

a more lenient approach in order to lessen the administrative burden and enable as many credits as possible to enter the market. Certain standards are limited to particular project types (e.g. forestry) while others exclude some project types in order to focus on the social benefits of carbon projects. It is important to note that the vast majority of voluntary offsets are currently not certified by any third-party standard. This is likely to change over the coming years.

General Standard Information

The summary table provides broad comparisons and summaries of the standards. Each of the criteria is briefly put in context and explained below.

Main Supporters

'Main Supporters' lists the type of stakeholder associated with each standard. Each of the reviewed standards has been developed and is supported by different groups of stakeholders. The types of stakeholders reflect to some extent the goal of the standard.

Market Share

Not all standards are equally influential. 'Market Share' indicates the size of each of the standards, and thus to some extent reflects the standard's importance.

Price of Offsets

'Price of Offsets' indicates the cost of one offset representing the reduction of 1 tonne of CO₂e. Offset prices depend on many different parameters, such as the type of project, the location, market demand, stringency of the standard requirements, etc. The pricing given in this column indicates average prices for different projects as of early 2008 (see chapter 7.)

Authors' Comments

The Authors' comments state the perceived goal of each standard and any relevant information about the standard. More in-depth commentary and information about each standard can be found in chapter 7.

Additionality

Additionality tests attempt to establish whether an offset project would have happened anyway. A major limitation of offset systems based on project-based mitigation is that emission reductions have to be measured against a counterfactual reality. The emissions that would have occurred if the market for offsets did not exist need to be estimated in order to calculate the quantity of emissions reductions that the project achieved. This hypothetical reality cannot be proven; instead, it must be inferred and its definition is always to some extent subjective (see chapter 5.1).

Additionality Tests (relative to CDM)

The CDM additionality tool (see appendix B) most commonly used for testing the additionality of CDM projects was developed carefully over several years. In this column it is used as a reference against which the other standards' project-based additionality testing procedures are compared:

- + Requirements go beyond and are more stringent than CDM rules
- Requirements are less stringent than CDM
- = Requirements are the same or very similar to CDM
- N/A Not Applicable

Although the CDM additionality tool is well respected, it does not guarantee that only additional projects are approved. Recent reports have shown that despite the fact that the additionality tool is required for all CDM projects, it is likely that a significant number of non-additional projects are registered (Schneider, 2007; Haya, 2007). Similar studies have not yet been carried out for VER projects. It is therefore impossible to know if VER standards likely have a higher or lower percentage of additional projects. It remains to be seen how well these standards will succeed in implementing their additionality requirements.

Some of the standards, such as the VCS and the VER+, plan to develop performance-based additionality tools (also called benchmark tools). By shifting the tasks of establishing a baseline from the project developer to the standard-setting organisation, benchmark tools could potentially increase transparency and decrease administrative burden for project developers. Yet such approaches also harbour the danger of certifying too many free riders. Benchmark rules will have to be closely examined to ensure that they minimize or mitigate the effects of non-additional offsets (see chapter 5.1).

Approval Process

Although offset markets are relatively straightforward in principle, they have been anything but straightforward to implement in practice. In part, this may be attributed to the inevitable birthing pains associated with creating institutions and stabilizing new markets. But problems also arise from inherent structural problems inherent in the conception of offset markets. Offset markets lack a critical competitive check found in well functioning markets, in which the interests of buyer and seller are naturally balanced against each other. In offset markets, both the seller *and* the buyer benefit from maximizing the number of offsets a project generates. This issue can partially be mitigated by imposing stringent requirements for auditors and an additional approval process through the standard organisation (see chapter 5.6).

Another conflict of interest arises from the fact that auditors are currently chosen and paid by a project's developer. There is thus pressure on auditors to approve projects in order to preserve their business relationships with the developers. This compromises the auditors' independence and neutrality. To account for this dynamic, offset markets need an administrative infrastructure to ensure that auditors' estimates of project reductions are reasonable.

Third-party Verification Required

To minimize the number of "free riders," most standards require third-part auditors to verify the emissions reductions.

Separation of Verification and Approval Process

Fundamental differences exist among standards as to how projects are reviewed and approved. Under the CDM, projects are verified by third-party auditors and then reviewed, approved or rejected by the CDM Executive Board. Most voluntary offset standards do not have such a body to review and approve the projects after the auditors have verified them. Projects are simply approved by the auditors themselves. The lack of a standard body which approves projects exacerbates conflicts of interest, particularly where auditors are selected and paid for by the project developer. None of the voluntary standards have specific procedures in place to review the approved auditors nor to allow for sanctions against or the discrediting of an under-performing auditor (see chapter 5.6).

Registry

Carbon offset registries keep track of offsets and are vital in minimizing the risk of double-counting, that is, having multiple stakeholders take credit for the same offset. Registries also clarify ownership of offsets (see chapter 5.7).

Offset Project Information

Each standard accepts different types of offset projects. The CDM, for example accepts all projects that reduce the six GHGs listed in the Kyoto Protocol, with the exception of the protection of existing forests (REDD), nuclear energy, and HFC destruction from new facilities (see chapter 5.2).

Project Types

REDD = Reduced Emissions from Degradation and Deforestation

EE = Energy Efficiency

RE = Renewable Energy

LULUCF = Land Use, Land-Use Change and Forestry = Bio-Sequestration

Excludes Project Types with High Chance of Adverse Impacts

Some project types are more likely to have adverse social and environmental impacts. Some standards therefore exclude these projects types, such as tree plantations and monocultures which are detrimental to biodiversity and can negatively impact watersheds or large hydro projects, which can displace large numbers of people.

Sustainable Development

Co-benefits are social and environmental benefits that go beyond the GHG reduction benefits of offset projects. Such benefits include job creation, improved local air quality, protected and enhanced biodiversity, etc. The Clean Development Mechanism (CDM) was approved by developing nations specifically because offset projects were not only to provide cost-effective reductions for Annex 1 countries but also development benefits for the host countries. In other words, to qualify as a CDM project, the original intention was that a CDM project would have to deliver development benefits. In practice, the CDM has failed to consistently deliver such development and sustainability benefits (Holm Olsen, 2007; Sutter and Parreño, 2007; see chapter 5.5.)

Co-Benefits (relative to CDM)

Voluntary standards vary in their requirements for co-benefits. This column highlights the co-benefit requirements of each standard, comparing them to the requirements of the CDM.

Many of the voluntary carbon offset standards that have been developed in the last few years represent a step in the right direction. They help address some of the weaknesses in the current offsetting process and foster climate mitigation projects. The voluntary market in particular has helped to shape climate actions in countries that have thus far been reluctant to enact strong policies. Even with far reaching cap-and-trade policies expected to be enacted in the medium term, there will likely always be room for a voluntary market. The demand for voluntary offsets will come from private and corporate actors who wish to go beyond regulatory requirements and will be supplied by mitigation projects in sectors that are not capped. Well-designed standards will help the voluntary market mature and grow.

Main Supporters	Market Share	Additionality Tests (relative to CDM)	Third-party Verification Required	Separation of Verification and Approval Process	Registry	Project Types	Excludes Project Types with high chance of adverse impacts	Co-Benefits (relative to CDM)	Price of Offsets
Clean Development Mechanism									
UNFCCC Parties	large	=	yes	yes	yes	All minus REDD, new HFC, nuclear	no	=	€14–30
Authors' Comments:	The CDM is part of the Kyoto protocol and aims to create economic efficiency while also delivering development co-benefits for poorer nations. It has been successful in generating large numbers of offsets. Whether it also has delivered the promised development co-benefits is questionable.								
Gold Standard									
Environmental NGOs (e.g. WWF)	small but growing	=/+ ¹	yes	yes	Planned	EE, RE only	yes	+	VERs: €10–20 CERs: up to €10 premium
Authors' Comments:	The GS aims to enhance the quality of carbon offsets and increase their co-benefits by improving and expanding on the CDM processes. ¹ For large scale projects the GS requirements are the same as for CDM. Yet unlike CDM, the GS also requires the CDM additionality tool also for small-scale projects.								
Voluntary Carbon Standard 2007 (VCS 2007)									
Carbon Market Actors (e.g. IETA)	new; likely to be large	= ²	yes	no	Planned	All minus new HFC	no	-	€5–15 ³
Authors' Comments:	The VCS aims to be a universal, base-quality standard with reduced administrative burden and costs. ² The VCS plans to develop performance based additionality tests. These tools have not yet been developed and are thus not included in this rating. ³ Prices are for projects implemented under VCS ver. 1.								
VER+									
Carbon Market Actors (e.g. TÜV SÜD)	small but growing	=	yes	no	yes	CDM minus large hydro	yes	-	€5–15
Authors' Comments:	VER+ offers a similar approach to CDM for project developers already familiar with CDM procedures for projects types that fall outside of the scope of CDM.								
Chicago Climate Exchange (CCX)									
CCX Members and Carbon Market Actors	large in the US	-	yes	yes	yes	All	no	-	€1.2–3.1 ⁴
Authors' Comments:	CCX was a pioneer in establishing a US carbon market. Its offset standard is part of its cap-and-trade programme. ⁴ Sales in USD: \$1.8-4.5 per metric tonne (October 07-February 08)								
Voluntary Offset Standard (VOS)									
Financial Industry and Carbon Market Actors	N/A	=	yes	no	Planned	CDM minus large hydro	yes	=	N/A
Authors' Comments:	VOS closely follows CDM requirements and aims to decrease risks for offset buyers in the voluntary market.								
Climate, Community and Biodiversity Standards (CCBS)									
Environmental NGOs (e.g. Nature Conservancy) and large corporations	large for LULUCF	=	yes ⁵	no	N/A	LULUCF	yes	+	€5–10
Authors' Comments:	The CCBS aims to support sustainable development and conserve biodiversity. ⁵ The CCBS is a Project Design Standard only and does not verify quantified emissions reductions.								
Plan Vivo									
Environmental and social NGOs	very small	=	no	no	yes ⁶	LULUCF	yes	+	€2.5–9.5
Authors' Comments:	Plan Vivo aims to provide sustainable rural livelihoods through carbon finance. ⁶ It verifies and sells ex-ante credits only. Third party verification is not required but recommended.								

1. Introduction

“Carbon, the currency of a new world order” (Paul Kelly, *The Australian*, 21 March 2007)

Public awareness of the threat of climate change has risen sharply in the last couple of years and an increasing number of businesses, organizations and individuals are looking to minimize their impact on the climate.

To effectively address the threat of climate change, we need comprehensive and stringent policies to reduce greenhouse gas (GHG) emissions at national and international levels. At the same time, voluntary individual and corporate climate action can be essential for creating the public awareness and constituency needed for policy change.

Individuals and organizations can most effectively lower their own carbon footprints by improving energy efficiency (e.g. in their homes, offices, or factories), relying on lower-emission products (e.g. buying locally grown food), and changing consumption patterns (e.g. home size, travel choices). Beyond this, carbon offsets* are gaining prominence as a tool to compensate for emissions. By paying someone else to absorb or avoid the release of a tonne of CO₂ elsewhere, the purchaser of a carbon offset can aim to compensate for or, in principle, “offset” their own emissions. This is possible because climate change is a non-localized problem; greenhouse gases spread evenly throughout the atmosphere, so reducing them anywhere contributes to overall climate protection.

Yet carbon offsetting is not without its critics. A recent flurry of media reports has criticized the poor quality of carbon offsets projects in both the compliance and the voluntary market (e.g. Financial Times, 2007). Recent research reports have pointed out that a significant number of offsets come from projects that would have been implemented anyway (i. e. are non-additional, see chapter 5.1) (Schneider, 2007; Haya 2007) Many have also raised issues of equality and fairness based on the argument that carbon offsetting enables developed nations to perpetuate unsustainable lifestyles by funding carbon projects in developing countries. Some critics have pointed out that these offset projects rarely lead to benefits for the host community and have gone as far as calling the offset market as a form of carbon colonialism (Eraker, 2000.) Others assert that accounting methods for the offsets are too inaccurate to justify claims of real emission reductions or to support the achievement of ‘carbon neutrality.’

Despite these critiques, the carbon markets are growing rapidly. With more than € 20 billion[†] traded in 2006 (Capoor & Ambrosi, 2007), carbon markets are already a substantial economic force and will likely grow considerably over the coming years. It is therefore important to focus the discussion on how to use these markets most effectively to:

- Contribute to climate protection through real and additional, permanent, and verifiable greenhouse gas (GHG) reductions, while limiting unintended negative consequences.
- Reduce GHG emissions in an economically efficient way.
- Enhance the social and environmental benefits to project hosts.
- Stimulate social and technological innovation and participation by new actors sectors and groups.
- Create and build constituencies for more effective and comprehensive national and international solutions.
- Avoid perverse incentives that could stymie broader climate protection actions and policies.
- Synergistically work with other climate protection measures.

* *Carbon offset* and *carbon credit* are synonymous terms, yet the term *carbon credit* is more often used when referring to the compliance markets, such as CDM. The term *carbon offset* is more often used when referring to the voluntary market.

† All monetary figures were converted to euros, using the exchange rate from Feb, 5, 2008 of 1 USD = 0.67 euros. Standard fees listed in USD were left unchanged.

The voluntary offset industry has recognized the need for quality assurance in order to restore the credibility of the offset market. Over a dozen voluntary offset standards have been developed in the last few years. Yet no single standard has so far managed to establish itself as *the* industry standard. Each standard has a slightly different focus. Some closely mirror compliance market standards, while others take a more lenient approach in order to lessen the administrative burden and enable as many credits as possible to enter the market. Certain standards are limited to particular project types (e.g. forestry), while others exclude some project types in order to focus on the social benefits of carbon projects. It is important to note that the vast majority of voluntary offsets are currently not certified by a third-party standard. This is likely to change over the coming years. The next chapters provide an overview of the carbon markets in general and the compliance and voluntary offset markets.

2. Market Overview

In order to understand the carbon markets, it is important to recognize the differences between two fundamentally different types of carbon commodities, allowances and offsets, and the systems that create them. The first, allowances, are created by cap-and-trade systems. The second, offsets or carbon credits, are created by baseline-and-credit systems (also sometimes called a project-based system).

Under a **cap-and-trade system**, an overall cap is set to achieve emissions reductions. Each of the participants within a cap-and-trade system (usually countries, regions or industries) is allocated a certain number of allowances based on an emissions reduction target. In a cap-and-trade system the cap constitutes a finite supply of allowances, set by regulation and political negotiation. These allowances are then neither created nor removed, but merely traded among participants. This finite supply creates a scarcity and drives the demand and price for allowances.

A cap-and-trade system aims to internalize (some of) the costs of emissions, and thus drives actors to seek cost-effective means to reduce their emissions. The challenge in a cap-and-trade programme is to determine the appropriate level at which to set the cap, which should be stringent enough to induce the desired level and rate of change, while minimizing overall economic costs.

A **baseline-and-credit system** in contrast, does not entail a finite supply of allowances. It does not involve projects that are implemented under the umbrella of a cap-and-trade system. Rather, more credits are generated with each new project implemented. These credits can then be used by buyers to comply with a regulatory emission target, to “offset” an emitting activity (such as an airline flight), or to be a “carbon neutral” organisation with zero “net” emissions.

In a baseline-and-credit system a carbon offset buyer can only legitimately claim to offset his emissions if the emissions reductions come from a project that would not have happened anyway. This concept is called **additionality** in the carbon markets, and refers to the requirement that “[...] reductions in emissions [...] are additional to any that would occur in the absence of the certified project activity” (Kyoto Protocol in Article 12.5). Under a cap-and-trade system it is the cap and the allocations rules that drives demand, and determines the level of emissions reduction. Activities that are undertaken in response to the pressure of the cap therefore do not need to prove that they are additional. Additionality is discussed in detail in chapter 5.1.

Cap-and-trade systems often allow for a certain number of offsets to come from emissions reductions that are generated by projects that are not covered under the cap (i.e. from baseline-

and-credit systems)*. Under a cap-and-trade system the covered sources (for example power producers) have an obligation to reduce their emissions. If these covered sources cannot buy offsets, they will have to reduce their emissions in some other way (e.g. by buying allowances or by increasing efficiency in their plants). If they can buy offsets and these come from projects that are fully additional, then the offsets replace reductions that the cap-and-trade participant would have had to otherwise achieve himself. In other words, under a cap-and-trade system, offsets do not lead to emissions reductions beyond the target set by the cap but only cause a geographical shift in where the emissions reduction occurs. Therefore, non-additional offsets sold into a cap-and-trade system will actually lead to an *increase* in emissions since the buyer will not have reduced his emissions and the seller will not have offset this increase in emissions.

In a voluntary system, on the other hand, individuals and companies are not required to reduce their emissions. We can therefore assume that they would only do so to a limited extent. The availability of offsets enables them to go beyond what they would have done anyway to reduce their own emissions. The availability of offsets in the voluntary market may therefore lead to additional emissions reduction that would not have happened without the availability of offsets. Buyers in the voluntary market can only claim a unique, incremental “offset” reduction if the reduction is additional. Yet even without additionality tests, the offset market might induce reductions that would not have happened otherwise, because the market will bring investment to some projects at the margin. But without clearly established additionality, there is no one-to-one correspondence between each credit sold and an additional tonne of reductions.

TABLE 1: ***Distinguishing Features of Cap-and-Trade and Baseline-and-Credit Systems***

Features	Cap-and-trade	Baseline-and-credit
Exchanged commodity	Allowances	Carbon Credits
Quantity available	Determined by overall cap	Generated by each new project
Market dynamic	Buyers and sellers have competing and mutually balanced interests in allowances trades.	Buyers and sellers both have an interest in maximizing the offsets generated by a project.
Sources Covered	Usually high emitters such as the energy sector and energy intensive industries	As defined by each standard. Not limited to just high emitting sectors.
Independent third party	Minor role in verifying emissions inventories.	Fundamental role in verifying the credibility of the counterfactual baseline and thus the authenticity (“additionality”) of the claimed emission reductions.
Emissions impact of trade	Neutral, as is ensured by zero-sum nature of allowance trades.	Neutral, providing projects are additional. Otherwise, net increase in emissions. Possible decrease in emissions in the voluntary market.

Cap-and-trade systems exist almost exclusively in the compliance market†. Baseline-and-credit systems exist both in the compliance and in the voluntary market. All currently established cap-and-trade programs allow for a limited use of offsets and have an associated offset programme:

* For example, the EU-ETS allows for CDM credits (CERs) to be used interchangeably with their allowances (EUAs). In the case of the EU-ETS, it is the countries themselves who set the limit on what percentage of CERs are allowed into their system. Allowing CERs will de-facto increase the number of available allowances and therefore raises the cap. On the other hand, it makes achieving reductions potentially more cost effective.

† An exception to this is the Chicago Climate Exchange which is a voluntary but legally binding cap-and-trade regime.

TABLE 2: *Types of Carbon Trading Programs*

Type of Programme	Cap-and-Trade	Associated Baseline-and-Credit (Offset) Programme
Compliance Market	Emissions Trading under Kyoto Protocol	CDM & JI
	EU-ETS	CDM & JI
	RGGI	RGGI Offset Programme
	Western Climate Initiative	under development
Voluntary Market	Chicago Climate Exchange (CCX)	CCX Offset Programme

Except for the CCX Offset Programme, voluntary offset standards are independent of and function outside of a cap-and-trade system*. The following sections provide a brief overview of the compliance and the voluntary markets.

2.1 Compliance Market

Carbon markets exist both under compliance schemes and as voluntary programs. Compliance markets are created and regulated by mandatory national, regional or international carbon reduction regimes.

Cap-and-Trade Systems

Emissions Trading Under the Kyoto Protocol

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) established a cap-and-trade system that imposes national caps on the greenhouse gas emissions of developed countries that have ratified the Protocol (called Annex B countries[†]). Each participating country is assigned an emissions target and the corresponding number of allowances – called Assigned Amount Units, or AAUs. On average, this cap requires participating countries to reduce their emissions 5.2% below their 1990 baseline between 2008 and 2012. Countries must meet their targets within a designated period of time by:

- reducing their own emissions; and/or
- trading emissions allowances with countries that have a surplus of allowances. This ensures that the overall costs of reducing emissions are kept as low as possible; and/or
- meeting their targets by purchasing carbon credits: to further increase cost-effectiveness of emissions reductions, the Kyoto Protocol also established so-called *Flexible Mechanisms*: the Clean Development Mechanism (CDM) and Joint Implementation (JI).

European Union Emissions Trading Scheme

The Kyoto Protocol enables a group of several Annex I countries to join together and form a so-called 'bubble' that is given an overall emissions cap and is treated as a single entity for compliance purposes. The 15 original member states of the EU formed such a 'bubble' and created the EU Emissions Trading Scheme (EU-ETS). The EU-ETS is a company-based cap-and-trade system which came into force in 2005. Under this cap-and-trade scheme, emissions are capped and allowances may be traded among countries. The EU-ETS is the largest mandatory

* Although the Gold Standard also certifies CDM credits, it is a voluntary standard.

† **Annex 1 or Annex B?**

In practice, Annex 1 of the UNFCCC **Convention** and Annex B of the **Kyoto Protocol** are used almost interchangeably. However, strictly speaking, it is the **Annex 1** countries that can invest in **JI / CDM** projects as well as host JI projects, and **non-Annex 1** countries that can host CDM projects, even though it is the Annex B countries that have the emission reduction obligations under the Protocol. Note that Belarus and Turkey are listed in Annex 1 but not Annex B; and that Croatia, Liechtenstein, Monaco and Slovenia are listed in Annex B but not Annex 1. (source: www.cdmcapacity.org/glossary.html)

cap-and-trade scheme to date. In 2006, it traded 1.1 billion metric tonnes of CO₂e, valued at over €16 billion. There are currently several cap-and-trade compliance schemes that operate independently of the Kyoto Protocol. All of these also incorporate a baseline-and-credit component to their programme. Three examples are:

New South Wales GHG Abatement Scheme (NSW GHGAS)

The NSW GHGAS in Australia aims to reduce greenhouse gas emissions from the power sector. It achieves this by using project-based activities to offset the production of greenhouse gas emissions. The programme was established in 2003.

Regional Greenhouse Gas Initiative (RGGI)

RGGI is a multi-state regional cap-and-trade programme for the power sector in the Northeast United States. The RGGI cap-and-trade programme is proposed to start in 2009 and lead to a stabilisation of emissions at current levels (an average of 2002-2004 levels) by 2015, followed by a 10% reduction in emissions between 2015 and 2020. Some of the programme reductions will be achieved outside the electricity sector through emissions offset projects. Offsets serve as the primary cost containment mechanism in RGGI; if allowance prices rise above trigger prices, the ability for regulated sources to use offsets increases.

Western Climate Initiative (WCI)

The WCI is a collaboration of 5 Western US states and British Columbia launched in early 2007. The initiative set a goal of reducing greenhouse gas emissions by 15% from 2005 levels by 2020 and requires partners to develop a market-based, multi-sector mechanism to help achieve that goal, and participate in a cross-border greenhouse gas (GHG) registry.

Baseline-and-Credit Systems Used within Cap-and-Trade

The Clean Development Mechanism (CDM)

The CDM allows Annex I countries to partly meet their Kyoto targets by financing carbon emission reductions projects in developing countries. Such projects are arguably more cost-effective than projects implemented in richer nations because developing countries have on average lower energy efficiencies, lower labor costs, weaker regulatory requirements, and less advanced technologies. The CDM is also meant to deliver sustainable development benefits to the host country. CDM projects generate emissions credits called Certified Emissions Reductions or CERs – one CER is equal to one tonne of carbon dioxide equivalent – which are then bought and traded (see chapter 7.1 for more details on the CDM).

Joint Implementation (JI)

Joint Implementation works similarly to CDM, with the exception that the host country is not a developing nation but another Annex I country. The tradable units from JI projects are called Emissions Reductions Units (ERUs). It is not strictly a baseline-and-credit system since it also has aspects of a cap-and-trade system, and, notably, both participants have an overall reduction target.

The value of both JI and CDM projects has more than doubled in recent years, reaching a combined total of USD 5 billion (EUR 3.9 billion) in 2006 (Capoor & Ambrosi, 2007). Since JI officially starts in 2008, it is not surprising that over 90% of the credits transacted in these markets were produced by CDM projects.

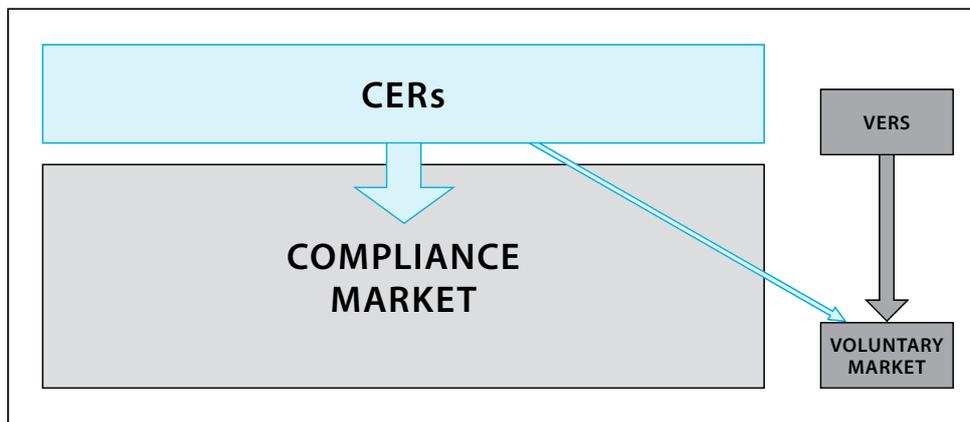
The EU-ETS Linking Directive

The EU Linking Directive, which was passed in 2004, allows operators in phase 2 of the ETS to use credits from Joint Implementation (JI) and the Clean Development Mechanism (CDM) to meet their targets in place of emission cuts within the EU. Member States specify a limit up to which individual installations will be able to use external credits to comply with the ETS. These limits vary between 0% (Estonia) and 22% (Germany) of allowances. There are also restrictions on use of CERs from forestry projects and from certain types of large hydro projects.

2.2 Voluntary Carbon Markets

The voluntary carbon markets function outside of the compliance market. They enable businesses, governments, NGOs, and individuals to offset their emissions by purchasing offsets that were created either through CDM or in the voluntary market*. The latter are called VERs (Verified or Voluntary Emissions Reductions). It is noteworthy that about 17% of the offsets sold in the voluntary market in 2006 were sourced from CDM projects (Hamilton, 2007)

CHART 1: **Carbon Offsets in the Compliance and in the Voluntary Market**



Unlike under CDM, there are no established rules and regulations for the voluntary carbon market. On the positive side, voluntary markets can serve as a testing field for new procedures, methodologies and technologies that may later be included in regulatory schemes. Voluntary markets allow for experimentation and innovation because projects can be implemented with fewer transaction costs than CDM or other compliance market projects. Voluntary markets also serve as a niche for micro projects that are too small to warrant the administrative burden of CDM[†] or for projects currently not covered under compliance schemes. On the negative side, the lack of quality control has led to the production of some low quality VERs, such as those generated from projects that appear likely to have happened anyway (see chapter 5.1 on additionality.)

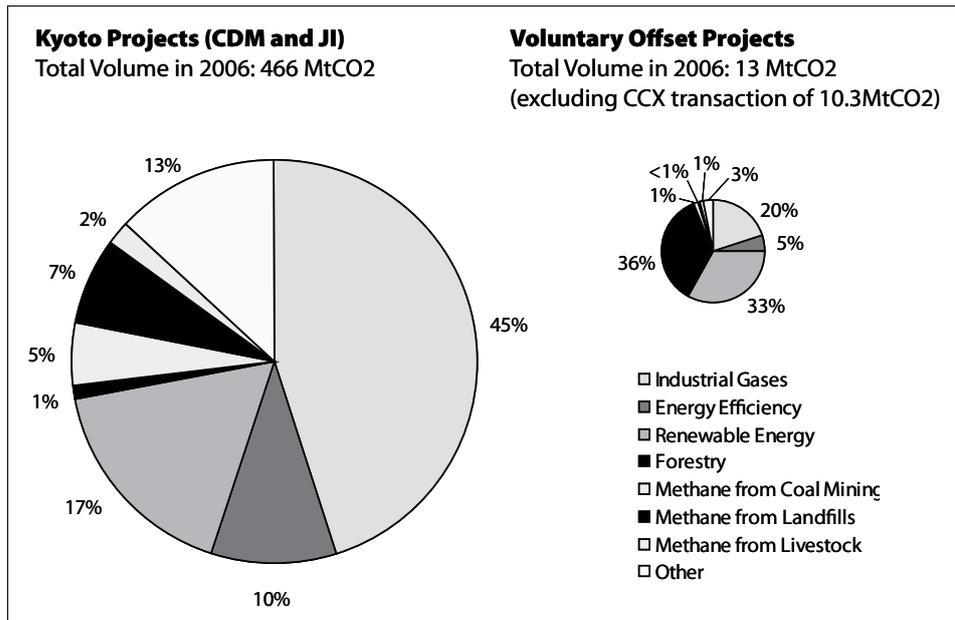
2.3 Voluntary and Compliance Carbon Market Size

Compared to the compliance market, trading volumes in the voluntary market are much smaller because demand is created only by voluntary wish to buy offsets whereas in a compliance market, demand is created by a regulatory instrument. Because there is much lower demand, because quality standards are not widely established, and because they are not fungible in compliance markets, carbon offsets sold in the voluntary market tend to be cheaper than those sold in the compliance market.

* When compliance market credits are used for voluntary offsetting, they are retired, thus do not go towards assisting or meeting any legally-binding reduction targets.

† According to project developers, carbon offset project must reduce at least 5,000 metric tonnes of CO₂ per year in order to justify the CDM transaction costs. (myclimate, personal communication.)

CHART 2: **Offset Trading Volumes in the Kyoto and in the Voluntary Markets**



(Source: Capoor, 2007; Hamilton 2007)

In 2006, 23 million tonnes of CO₂e were traded at a value of €62.6 million (Hamilton, 2007) in the voluntary market – the trading value of the compliance market, including allowances and credits was €23 billion in 2006. The value of CDM and JI credits was €3.8 billion in 2006. (Capoor and Ambrosi, 2007.) Nevertheless, the voluntary carbon market has grown dramatically over the last couple of years. According to a recent report, the voluntary offset market grew 200% between 2005 and 2006 (Hamilton, 2007).

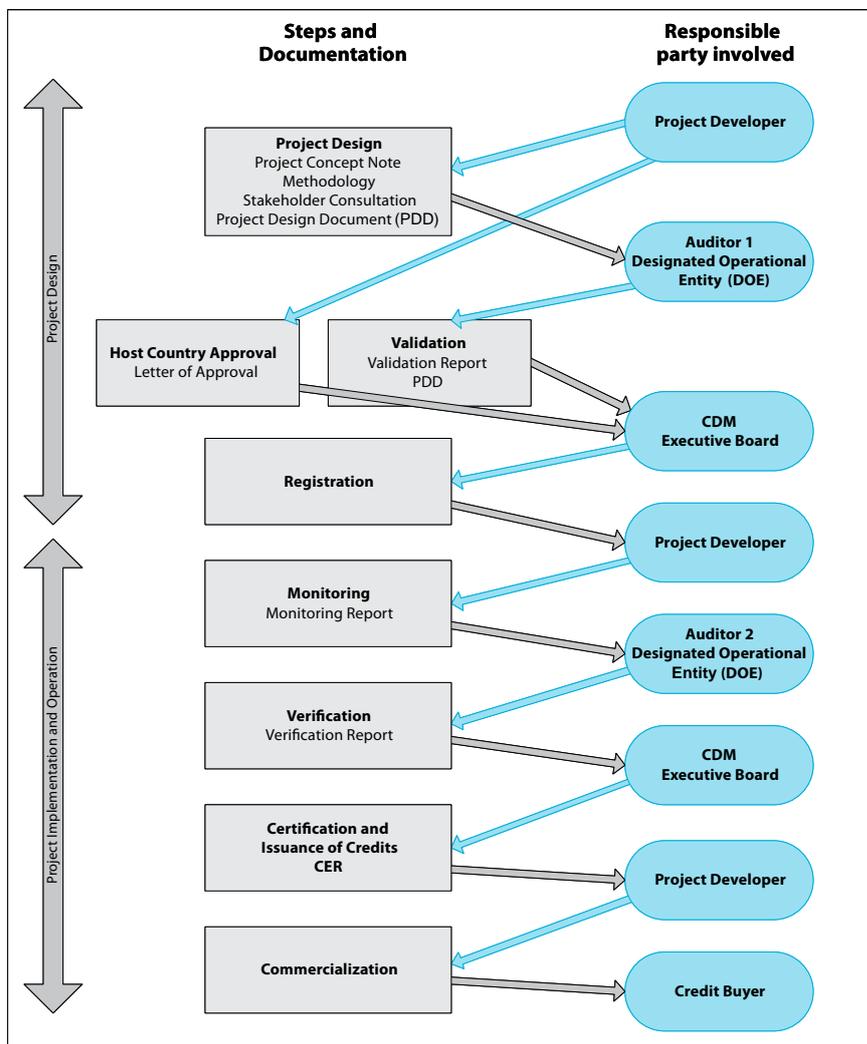
3. How Offset Projects Are Implemented

3.1 The Stages of the CDM Project Cycle

This chapter provides a brief overview of how offset projects are developed under the CDM. The CDM has established detailed guidelines and procedures for project developers. Although the project development process for projects implemented under a voluntary offset standard are somewhat different from CDM procedures, the CDM project cycle can serve as a frame of reference to analyze the different standards.

The CDM Executive Board (CDM EB) requires that all CDM projects follow a set of project development steps that are referred to as the project cycle. CDM project activities can only deliver Certified Emission Reductions (CERs) if the project itself and its successful operation have been approved by the CDM EB. Each stage of the project cycle is outlined below.

CHART 3: *The CDM Project Cycle*



Project Design

The Project Design stage includes developing a project concept, choosing or developing a baseline and monitoring methodology, and stakeholder consultations. All of these elements are documented in the project design document (PDD).

Project Concept

A feasibility study of a potential CDM project is conducted to assess the technical feasibility, investment requirements, development and operational costs, expected returns, administrative and legal hurdles, and project risks and pitfalls. Based on the results of the feasibility study, the project owner will decide whether or not to continue development of the potential CDM project.

Methodology

A CDM methodology defines the rules that a project developer needs to follow to establish a project baseline and to determine project additionality (see chapter 5.1), to calculate emission reductions and to monitor the parameters (e.g. electricity produced by the project) used to estimate actual emission reductions. It is a generic recipe that can be applied to different projects within a given project type (e.g. renewable power production) and applicability conditions (e.g. grid-connected). If no approved methodology exists for a specific project type, a project developer can submit a new methodology for approval to the CDM Methodology Panel*.

236 methodologies have been submitted for approval, 110 have been rejected, 28 are pending and 98 methodologies have been approved so far†.

Project Design Document (PDD)

The Project Design Document (PDD) describes the CDM project activity in detail and forms the basis for all future planning and administrative procedures. It contains a description of the chosen technology and explains the methodology used to define the baseline scenario, to confirm additionality and to calculate emission reductions. It also contains information on the monitoring of all relevant technical parameters (e.g. temperature, gas flow rates, electricity productions, operation hours, etc.) including, how monitoring procedures will be established, measurements will be made, quality will be controlled, and records will be stored and accessed. It contains an estimate of the volume of emission reductions achieved by the project. Finally, it documents how the project contributes to sustainable development.

The PDD plays a central role in project development. It serves as the basis for evaluating all carbon credit transactions and contract proposals for a CDM project. The PDD is used throughout the implementation phase to ensure that the project performs according to the parameters outlined in the document.

Stakeholder Consultation(s)

CDM projects are required to provide evidence that the project's activities will not adversely impact local populations and other relevant stakeholders. To ensure that all relevant stakeholders have been provided an opportunity to comment on the proposed CDM project, the project developer must inform them about the project through appropriate forms of media. The project developer must respond to all stakeholder comments, and describe a course of action to minimize negative impacts. The outcomes of the stakeholder consultations must be documented in the Project Design Document (PDD).

* The Methodologies Panel (Meth Panel) was established to develop recommendations to the Executive Board on guidelines for methodologies for baselines and monitoring plans, and to prepare recommendations on submitted proposals for new baseline and monitoring methodologies.

† UNEP, November 2007

Project Validation

After the project developer has written the PDD, an independent UN-approved third-party auditor conducts the project validation. Under CDM auditors are called **Designated Operational Entities** or DOEs. The process of CDM project validation normally consists of four phases:

- a desk review of the PDD,
- on-site visits and follow-up interviews with project stakeholders,
- a 30 day public comment period after the PDD has been made available through the internet
- resolution of outstanding issues, and
- the issuance of the final validation report and written by the DOE.

After completion, the validation report and the PDD are submitted to the CDM Executive Board for review and registration.

Host Country Approval

Final acceptance of a CDM project by the CDM EB is not possible without the approval of the project's host country. The project documentation must be submitted to the relevant authority which checks the project activity against national rules and regulations and confirms the project's compliance with the host country's sustainability criteria. This screening process and host country requirements vary from country to country.

Project Registration

The registration of a project by the CDM EB as a CDM project is a major step in the CDM project cycle. The CDM EB's decision to register a project is based on the review of the PDD and the validation report and public feedback. Once the CDM EB approves a project it is officially registered as a CDM project.

Project Implementation

The project can begin implementation anytime during the project cycle. However, if the project is implemented before it is registered by the CDM Executive Board, then the project developer has to supply documentary evidence proving that they considered CDM revenues at the time of planning the project. The documentary evidence must be supplied at the time of seeking CDM registration. If documentary evidence is not supplied, then the project is likely to be rejected on the grounds that it is not additional.

Project Monitoring

Project developers are required to maintain records measuring the emission reduction achieved during the operation phase. These records, maintained in a monitoring report, must be in accordance with the parameters and procedures laid out in the original PDD that was validated by the DOE and registered by the CDM EB. Emission reductions are issued based on the monitoring report. Therefore, a project developer will make the trade-off between having continuous CER income (many short monitoring periods) and lower administrative costs (long monitoring periods). There are no requirements as to how long or short a monitoring period must be as they ranges from a few weeks to several years.

Project Verification

The monitoring that the project developer has done is then evaluated and approved by a DOE. To minimize conflict of interest, the validating DOE cannot also conduct project verification. A different auditor must be chosen for this task. This is called Project Verification. The project developer has to submit the monitoring report to the DOE along with relevant supporting documents. The DOE undertakes a desk review of the report to ensure that the monitoring has been carried out in accordance with the procedures laid out in the original PDD. The DOE may also undertake a site visit, if necessary. Following the desk review and site visit, the DOE prepares a draft verification report highlighting any issues in the process. Once the project developer resolves these issues, the

DOE prepares the final verification and certification report, which also quantifies the actual emission reductions achieved by the project.

Verification is done at time intervals freely chosen by the project developer or project owner and is usually a consideration between having low costs (long intervals) and frequent sales revenues (short intervals).

Project Certification

The verification report is submitted to the CDM EB for certification and issuance of CERs. The issued CERs are then transferred to the CDM registry account of the relevant project participant after the mandatory fees are paid to the UNFCCC secretariat.

Commercialization

At the commercialization stage, a project developer sells the carbon credits from a project to a prospective buyer. The credits can either be sold directly to a company that requires it to meet its legally binding or voluntary emission reduction obligations or it can be sold to a trading company that facilitates the transaction between the seller and the end user of the credits.

A contract to sell the carbon credits from a project can be signed at any stage during the project development cycle. Depending on the project developer's risk appetite, some will sign contracts as early as the planning stage (i.e. forward contracts), lock in the price and other terms, and insulate themselves from the risks of price volatility while others will wait until the credits are generated, certified and issued before selling them (i.e. spot market sales). The project developer usually receives payment for the credits only after they have been delivered. However, in a few cases, a project developer may receive an advance payment. This is usually done if the project developer wants to bridge an investment gap or needs to meet cash flow requirements during the project's implementation (see chapter 6.3).

3.2 Who Is Who in a Carbon Offset Project

Designing, implementing and operating a carbon offset project requires the involvement of a large number of parties, stakeholders and authorities. Even though the parties involved differ from project to project some general categories and types of stakeholders can be defined as follows.

Project Owner

The operator and owner of the physical installation where the emission reduction project takes place can be any private person, company or other organisation.

Project Developers

A person or organisation with the intention to develop an emission reduction project could be the project owner, a consultant or specialized services provider.

Project Funders

Banks, private equity firms, private investors, non-profit organizations and other organizations may lend or invest equity to fund a project. Some of the standards have rules to what kind of funding, aside from the offset revenue, are acceptable for an offset project.

Stakeholders

Stakeholders are individuals and organizations that are directly or indirectly affected by the emission reduction project. Stakeholders include the parties interested in developing a specific project (e.g. owner, developer, funder, local population, host community), parties affected by the project (e.g. local population, host community environmental and human rights advocates) and national and international authorities.

Third Party Auditors Validators and Verifiers

The CDM and many of the voluntary offset standards require a third-party auditor to validate and verify a project's climate saving potential and achieved emission reductions. Under CDM the auditors are called Designated Operational Entities (DOEs). To minimize conflict of interest, the validating DOE cannot also conduct project verification.

Standards Organisation

In the absence of national and international legislation, standard organizations define a set of rules and criteria for voluntary emission reduction credits.

Brokers and Exchanges

In the wholesale market, emission offset buyers and sellers can have a transaction facilitated by brokers or exchanges. Exchanges are usually preferred for frequent trades or large volumes of products with standardized contracts or products, while brokers typically arrange transactions for non-standardized products, occasionally traded and often in small volumes.

Trader

Professional emission reduction traders purchase and sell emission reductions by taking advantage of market price distortions and arbitrage possibilities.

Offset Providers

Offset providers act as aggregators and retailers between project developers and buyers. They provide a convenient way for consumers and businesses to access a portfolio of project offsets.

Final buyers

Individuals and organizations purchase carbon offsets for counterbalancing GHG emissions. Therefore, the final buyer has no interest in reselling the offset but will prompt the retirement of the underlying carbon offset.

4. The Role of the Voluntary Market

After giving a brief overview about how offset projects are developed, we now examine how the voluntary markets differ from CDM and how the standards that have been developed for the voluntary market approach carbon project management.

Key differences exist between the mandatory and voluntary markets. Unlike the former, voluntary markets do not implement any particular policy mandates. The mandatory and voluntary markets occupy different but overlapping niches. As chart 1 shows, the voluntary offset market is currently fed by two distinct offset streams: offsets that originate in the compliance market (e.g. CERs from CDM projects) and offsets that are created in the voluntary market (Verified Emissions Reductions – VERs). In other words, voluntary offset buyers can choose if they want to buy offsets that come from CDM or JI projects or offsets that come from projects implemented exclusively for the voluntary offset market.

In order to better understand the voluntary market, it is helpful to ask what role it should play in protecting the climate and contributing to sustainable development. Compared to the compliance market, trading volumes are minimal in the voluntary market (see chart 2). The voluntary market does currently not make significant contribution to reducing GHGs. Furthermore, effective future climate policy will necessarily involve a gradual transition from voluntary to mandatory action, and eventual regulation (through allowance markets or other policies) of many of the actors currently involved in the voluntary market. While there will likely always be a voluntary offset market to serve those individuals or companies who want to push the envelope beyond what is possible through internal reductions and evolving regulation, a key role of the voluntary market is to shape the rules

and procedures for offsets in future compliance markets*. In other words, the voluntary market can be used as a testing ground for procedures, methodologies and technologies. The voluntary market can help achieve emissions reductions with projects that are too small for CDM, projects set in countries without a Kyoto target, or reductions that are ineligible for CDM for formal reasons other than quality (e.g. China CDM requires major Chinese ownership in project).

The opinions on how the voluntary market can best do this, vary significantly. To clarify this ongoing discussion, we distinguish below between three main points of view. The distinction between these viewpoints is somewhat theoretical since most market participants have views that synthesize aspects of all three approaches. Yet juxtaposing these three views helps explaining the differences in how the voluntary market is perceived.

A. Voluntary Market Should Closely Follow, or Build Upon CDM

There are those, among them the governments of the UK and Norway (see chapter 8), who argue that under the current market situation voluntary buyers can minimize their risk by buying compliance credits because the legal and procedural requirements for CERs are already well established. The current voluntary offset market is seen as potentially undercutting the compliance market with cheaper offsets that are not clearly additional and sending the wrong price signals. Since the public and the media often do not distinguish between the compliance and the voluntary market, there is also a risk of damaging the reputation of compliance markets. To secure quality and transparency in the voluntary market, it is argued that voluntary offset standards should closely follow CDM procedures and apply them to VERs (e.g. the CDM approach to additionality, the documentation of reductions, and the monitoring and verification processes).

Standards that share this viewpoint include VER+ and the Voluntary Offset Standard (VOS).

B. Voluntary Market Should Be More Stringent than CDM

Some have taken this argument even further and have created standards with the explicit goal of enhancing the quality of offsets from both markets by requiring explicit social and environmental benefits as well as strict accounting standards (see chapter 5.5 on Co-Benefits.)

Standards that espouse this viewpoint include the Gold Standard and the Climate Community & Biodiversity (CCB) Standard.

C. Voluntary Market Should Complement and Be Different From CDM

On the other end of the spectrum are those who argue that voluntary offset standards should be less stringent and bureaucratic than the standards in the mandatory markets. They agree that the voluntary market can serve as a testing ground for future policy but they argue that in order to preserve the voluntary market's creativity and innovation it must be protected from too many bureaucratic requirements. They distinguish between the compliance market, where regulatory obligations must met, and the voluntary market, where no such obligations exist and where the emphasis is on creating a market for innovative projects with as little administrative burden as possible.

Most carbon offset providers who do not use a third party standard but follow their own procedures fall under this category. The Voluntary Carbon Standard (VCS) also adheres more closely to this viewpoint. Although VCS incorporates many of the CDM procedures and guidelines, it is in principal a standard that looks to loosen the requirements for VER projects to allow for more flexibility and innovation.

The tension between these different viewpoints on the proper function of the voluntary market has shaped the market's recent development. As with any complex issue, the devil lies in the details.

* This implies that if the voluntary market is successful, it will become obsolete in its current form in the medium term as more comprehensive and effective mandatory policies are put in place. Yet there may always be a need for voluntary markets to serve sectors that are not included in compliance schemes.

All sides have contributed to the discussion on the role the voluntary carbon market can play to further climate protection. Numerous new standards and registries have been introduced over the last couple of years and the competition among carbon offset standards has increased dramatically since large financial institutions, businesses, and industries have gotten involved in the carbon trade. In the next section we will discuss the elements that are necessary to create an effective carbon offset standard.

5. Key Elements of Offset Standards

“Carbon offsets are an intangible good, and as such their value and integrity depend entirely on how they are defined, represented, and guaranteed. What the market lacks are common standards for how such representations and guarantees are made and enforced “ (Broekhoff, 2007)

Clearly, no standard can ever be perfect, and as pointed out in the discussion above each of the currently available standards is based on a particular view of the voluntary offset market. Yet it is safe to say that notwithstanding these differences, the best and most successful standards will be those that are simple yet rigorous and have very wide support from carbon project developers, offset traders and buyers, environmental NGOs and the financial industry. A complete and full-fledged carbon offset standard must include the following three components*:

- Accounting Standards
- Monitoring, Verification and Certification Standards
- Registration and Enforcement Systems

Accounting standards ensure that offsets are “real, additional, and permanent.” They include definitions and rules for the elements that are essential during the design and early implementation phase of a project. These include additionality and baseline methodologies, definitions about accepted project types and methodologies, validation of project activity etc (chapter 5.1-5.6).

Monitoring, Verification and Certification Standards ensure that offset projects perform as was predicted during the project design. Certification rules are used to quantify the actual carbon savings that can enter the market once the project is up and running. There is sometimes a lag time between the start of a project and when it starts producing carbon offsets. This is especially true for forestry projects – the trees have to grow for a few years before they have absorbed enough carbon that can be quantified and sold. Monitoring, verification and certification happen after validation and implementation of the project. Yet procedures and protocols for monitoring and verification have to be included very early on in the project design phase (chapter 5.6).

Verification and certification are *ex-post* assessments of what has actually been produced, as opposed to validation which is the *ex-ante* assessment of whether a project qualifies against a standard, provided it is going to do what it promises in the project design documentation.

3. Registration and Enforcement Systems ensure that carbon offsets are only sold once and clarify ownership and enable trading of offsets. They must include a registry with publicly available information to uniquely identify offset projects and a system to transparently track ownership of offsets (chapter 5.7).

In the following sections we discuss each of these elements in more detail and compare the voluntary offset standards to the CDM rules and regulations. A table at the end of each section, summarizes how each standard handles that particular issue.

* Much of the content in this section is based on the analysis of Derik Broekhoff’s (World Resources Institute) Testimony before The House Select Committee on Energy Independence and Global Warming, U.S. House Of Representatives, July 18, 2007; http://pdf.wri.org/20070718_broekhoff_testimony.pdf

5.1 Additionality and Baseline Methodologies

*“Offsets are an imaginary commodity created by deducting what you hope happens from what you guess would have happened.” (Dan Welch quoted in *The Guardian*, June 16 2007)*

The topic of ‘additionality’ is the most fundamental – and contentious – issue in the carbon offset market. In theory, additionality answers a very simple question: Would the activity have occurred, holding all else constant, if the activity were not implemented as an offset project? Or more simply: Would the project have happened anyway? If the answer to that question is yes, the project is not additional.

Additionality makes intuitive sense: If I buy carbon offsets, I make the implicit claim that I forgo reducing my own emissions (i.e. I still drive my car) in exchange for paying someone to reduce their emissions in my stead. If I “neutralize” the emissions I caused while driving my car by buying offsets from someone who would have reduced their emissions anyway, regardless of my payment, I, in effect, have not neutralized my emissions but merely subsidized an activity that would have happened anyway.

Additionality is thus an essential element needed to ensure the integrity of any baseline-and-credit scheme. Yet additionality is very difficult to determine in practice. Many different tools have been developed to maximize the accuracy of additionality testing and to minimize the administrative burden for the project developer. There are two distinct approaches to additionality testing: Project based additionality testing and performance standards.

5.1.1 Project Based Additionality Testing

Project based additionality testing evaluates each individual project on a case by case basis. The following is a short selection of additionality tests that are commonly used:

Legal and Regulatory Additionality Test (Regulatory Surplus)

If the project is implemented to fulfil official policies, regulations, or industry standards, it cannot be considered additional. If the project goes beyond compliance (“regulatory surplus”), it may be additional, but more tests are required to confirm this. For example, an energy efficiency project might be implemented because of its cost savings and would in this case not be additional.

Investment Test

This test assumes that an offset project is additional if it would have a lower than acceptable rate of return without revenue from the sale of carbon offsets. In other words, the revenue from the carbon offsets must be a decisive reason for implementing a project. The investment test is consistent with a microeconomic view of behaviours, and in theory would be a perfect additionality test. But in reality there may be projects whose finances make them look non-additional that are still “additional” because of existing non-monetary barriers.

Barriers Test

This test looks at implementation barriers, such as local resistance, lack of know-how, institutional barriers, etc. If the project succeeds in overcoming significant non-financial barriers that the business-as-usual alternative would not have had to face, the project is considered additional.

Common Practice Test

If the project employs technologies that are very commonly used, it might not be additional because it is likely that the carbon offset benefits do not play a decisive role in making the project viable.

Which test is best suited to validate additionality depends on the type of project. An additionality test appropriate for one type of project (e.g., a simple regulatory test for methane flaring, where there is no reason to do the project if not required by law) might not be sufficient for other kinds of projects (e.g., energy efficiency, where there could be plenty of reasons for doing a project besides complying with regulations).

The main issue with project-based additionality testing is that the determination of whether a project is additional can be quite subjective. A developer can claim that their project's IRR was too low without a carbon revenue stream, and that the carbon revenues therefore made the project viable. But who can really determine what level of IRR is acceptable to a given company, and thus whether the additionality demonstration is valid? Such additionality claims can only be tested with access to internal company information relating to the financing of the project, yet this information is in most cases confidential.

5.1.2 Performance Standards

Performance Standards try to address some of the weaknesses of project-based additionality tests in that they do not rely on examining each individual project but establish a threshold for technologies or processes to determine additionality. This approach is associated with simpler procedures and lower transaction costs for project developers. Performance standards are developed and/or approved by standard organizations and therefore shift much of the project developer's administrative burden to the standard organisation. Drafting performance standards requires comprehensive data collection and verification, as well as regular updates. The political process to approve such performance standards may take a long time and may only be feasible for certain industries (e.g., small renewable heat and power, biomass, or small energy efficiency).

Performance Standards typically use aggregated data on project or technology characteristics to establish a threshold (e.g., a performance indicator such as an emissions rate or a market indicator such as a penetration rate) that must be met or exceeded in order for a project to be deemed additional. Performance Standards include among others positive technology lists and benchmark approaches.

Benchmark Approaches

The most widely discussed of performance standards is the emissions-based (benchmark) additionality test. This test establishes a generic baseline scenario – referred to as a benchmark – against which all projects of a given type are assessed. Employing such an assessment as an additionality test presumes that technologies with emissions lower than a given emission rate standard would not be deployed in the absence of the offset programme incentive.

This method works best in sectors or applications where business-as-usual technologies and fuels do not vary widely in emissions rates. In sectors like electricity generation, where emissions rates can be as low as near zero for some hydroelectric plants or relatively high for coal-based plants – both of which are conventional technologies – benchmarking emissions rates can be problematic. For example, any threshold above zero would deem all new hydroelectric or wind development additional.

Several CDM baseline methodologies include benchmark approaches for calculating baselines and emission rates, but additionality must still to be established by using project-based additionality tests (see chapter 5.1.3).

Positive Technology Lists

Positive technology lists simply define which technologies are automatically considered additional if installed in a certain geographic region. The project developer must still use a baseline methodology to determine the numbers of offsets a project will create. Again, such lists are transparent and enable faster and simpler processing of offsets. They also shift much of the administrative burden from individual project hosts to a centralized standard-setting entity.

The main problem with performance standards is that they may be too simple and broad. All activities whose emissions fall below the benchmark emissions are awarded credits, regardless of whether they would have taken place anyway. Projects that are non-additional are referred to as **free-riders**. One proposed solution to the problem of free-riders would be to discount offsets by the number of expected free riders. For example, if a benchmark is set at the 20th percentile, we can expect 20% of projects to be free-riders. If all offsets were then discounted by 20%, the overall

environmental integrity would be preserved. Yet discounting is not a perfect solution either since it may skew the results and favor non-additional projects, which by definition rely less on offset revenue.

To summarize, any additionality test, no matter how quantitative and seemingly objective, will always create some number of false positives (projects that appear additional although they are not) and some number of false negatives (projects that appear not to be additional although they are). The design of the test determines if it will err on the side of false positives or false negative. The judgment as to which is more acceptable is determined by a political process. It is important to understand that while false positives and false negatives both impair economic efficiency, only false positives undermine the environmental integrity of offsets. In other words, it is the false positives – offsets from non-additional projects – that lead to increases in emissions and therefore hamper climate protection goals. The most practical and viable option for additionality testing may mix elements of project based and benchmark approaches.

5.1.3 TABLE 3: **Additionality Requirements for Each Standard**

Standard	Project-Specific Additionality or Performance Standards?	How is additionality determined?
CDM	Project-specific	Specified by individual methodologies or Additionality Tool version 4: Step 1: Regulatory Surplus Step 2: Investment analysis or Step 3: Barrier analysis. Step 4: Common Practice Step 5: Impact of CDM Registration
GS	Project-specific, same as CDM	Gold Standard CER and VER CDM Additionality Tool version 4 In addition for both CERs and VERs: Previous announcement checks required for all project types.
VCS	Project-specific or performance-based Currently approved additionality tests are all project-specific.	Project based test: Step 1: Regulatory Surplus Step 2: Implementation Barriers: Investment barrier or technological barrier or institutional barrier Step 3: Common Practice
VER+	Project-specific, same as CDM	Specific additionality requirements of CDM approved methodologies or Most recent version of CDM Additionality Tool Performance tests have not yet been developed
CCX	Primarily performance-based. No formal definition of additionality. Determinations are based on eligibility criteria, which are examined by the CCX Offsets Committee.	Additionality testing not as a distinct step. However, CCX rules explicitly define project eligibility requirements on the basis of these indicators: <ul style="list-style-type: none"> • beyond/before regulatory requirements • new projects • highly unusual practices
VOS	Project-specific, same as CDM	Same as CDM or Gold Standard VER
CCBS	Project-specific	Specified by individual methodologies. Step 1: Regulatory Surplus Step 2: Barriers: Financial, Lack of Capacity, Institutional or Market Barriers or Common Practice
Plan Vivo	Project-specific	Project based test: Step 1: Regulatory Surplus Step 2: Financial and Step 3: Barriers test (e.g. lack of technical expertise or prohibitive social, traditional, political or cultural environments. Commercial forestry projects are excluded from participation).

Standard	Project-Specific Additionality or Performance Standards?	How is additionality determined?
GHG Protocol	No formal requirements for additionality determination. Discusses additionality conceptually with respect to baseline determination.	Generic criteria on how to establish additionality either through project-specific or performance-based approaches.
ISO 14064-2	No formal requirements for additionality determination. ISO doesn't specify how additionality must be demonstrated.	Generic criteria on how to establish additionality either through project-specific or performance-based approaches.

5.1.4 Baselines

In order to calculate an offset project's GHG benefits, a baseline must be established. This baseline expresses the business-as-usual scenario. In other words, it represents the counterfactual scenario of what would have happened if the project had not been implemented. The number of credits generated by the project is equal to the difference between emissions in the baseline scenario and emissions resulting from the project. The key difficulty is that the baseline scenario is a *hypothetical* scenario; by definition it describes another reality, one in which the activity is *not* implemented as an offset project. As that scenario will never occur, there is no fail-safe way to divine with certainty what the results of that scenario would have been.

The baseline must be explicit and concrete enough to allow an estimation of the corresponding GHG emissions, so that the benefits of the offset project may be calculated. Baselines should be calculated conservatively so as not to overestimate the achieved emissions reductions.

The baseline must be based on verifiable information sources and documented in a confirmable manner.

As with additionality, baselines can be established using project based or performance based approaches. These may either be the same as the approach used to determine additionality or different. Performance based tools may increase transparency and decrease costs; however, they must be well designed to avoid inaccuracies and to ensure environmental integrity. If the baseline is defined by a performance standard, it provides a credible estimate of reductions in aggregate. Each standard usually chooses one approach or the other, although some use a combination.

Some standards prescribe upfront the methods that project developers must use to estimate baseline emissions for each type of allowable project activity (top-down). Others allow project developers to propose appropriate methods for new types of projects, following general programme guidelines (bottom-up). A purely bottom-up standard (like the CDM) is one in which project developers must propose, and win approval for, appropriate methods for every project category. Some programs may be a mix of top-down and bottom-up.

Baselines can be static or dynamic. A static baseline does not change over time, whereas a dynamic one is updated periodically based on ex-post observations, and emission reductions are calculated based on the most current baseline.

Many standards have different levels of requirements for different classes of projects. For example, some might have simplified baseline methodologies for small scale projects.

5.1.5 TABLE 4: **Baseline Requirements for Each Standard**

Standard	How are baselines determined?	How are methodologies determined and approved?
CDM	<p>Most are project-specific, though some methodologies use Performance standards as well (e.g. recently approved high-efficiency coal plant methodology)</p>	<p>New methodologies are submitted to the CDM Methodology Panel, which reviews methodologies and submits its recommendations to the CDM EB, which makes the final decision.</p>
GS	<p>Gold Standard CER: CDM approved methodologies</p> <p>Gold Standard VER: CDM methodologies or Small Scale Working Group (SSC WG) or United Nations Development Programme (UNDP) MDG Carbon Facility or proposed new methodology approved by Gold Standard Technical Advisory Committee.</p>	<p>Gold Standard CER: CDM approved methodologies</p> <p>Gold Standard VER: New methodologies must be reviewed by two independent experts and are then approved by the Gold Standard Technical Advisory Committee.</p>
VCS	<p>Projects will use one of the VCS Programme approved methodologies. At present CDM methodologies have been approved under the VCS. Currently CCAR is going through the approval process. If approved, the CCAR methodologies will also be approved under the VCS Programme.</p> <p>New methodology must be approved through a double approval process.</p> <p>Performance standards or best practice approaches are allowed but have not yet been developed.</p>	<p>Any new methodologies approved under a GHG Programme (e.g. CDM) that has been approved under the VCS are automatically recognised.</p> <p>Other individual new methodologies must be reviewed and approved by two VCS accredited independent verifiers and are then accepted by the VCS Board (though the Board retains the right to examine each methodology).</p>
VER+	<p>CDM approved baseline and monitoring methodologies</p> <p>Baselines that conform with JI rules and are approved by auditor.</p>	<p>CDM approved methodologies in their most current version. If no CDM methodology is available, the project specific approach as defined for JI may be used. The proposed methodology is assessed and approved by the auditor in charge.</p>
CCX	<p>Baselines and methodologies are pre-defined for each specific project type. Some are project based, some are performance based.</p>	<p>New methodologies are reviewed and approved by the CCX Committee on Offsets.</p>
VOS	<p>Same as CDM or Gold Standard VER</p>	<p>Same as CDM or GS VER. INCIS may decide to recognise other standards, or the application of specific methodologies contained within those other standards, in the future.</p>
CCBS	<p>Baselines as defined by CDM LULUCF methodologies or IPCC's Good Practice Guidance (IPCC GPG)</p>	<p>CDM LULUCF methodologies or IPCC's Good Practice Guidance (IPCC GPG)</p> <p>New methodologies are reviewed and approved by CCBS-approved auditors.</p>
Plan Vivo	<p>Project-specific baselines are reviewed and approved by the Plan Vivo Foundation</p>	<p>Projects and new methodologies are reviewed and approved by the Plan Vivo Foundation using standard criteria.</p>
GHG Protocol	<p>Generic guidelines for determining project-specific and performance standard baselines for any type of project.</p>	<p>N/A*</p>
ISO 14064-2	<p>Generic guidelines for determining project-specific and performance standard baselines for any type of project.</p>	<p>N/A</p>

* N/A Not applicable

5.1.6 Project Boundaries and Leakage

Each project must define its boundaries, including physical, legal and organizational boundaries. This is necessary in order to calculate the emissions reductions accurately: all emissions reductions and increases within the project boundaries must be taken into account. Some standards require specifying a boundary encompassing all the effects a project has on GHG emissions. Others do not explicitly spell out rules and guidelines on determining boundaries.

Leakage is a project's unintended effects on GHG emissions outside the project's boundaries. For example, a project may reduce GHG emissions in one place, but cause an unintended increase in emissions elsewhere. Under some standards, leakage is explicitly accounted for by examining emissions outside the project's boundaries. In many cases, it can be burdensome or impossible to trace every possible effect an individual project may have on GHG emissions. Standards therefore sometimes explicitly exclude certain types of leakage from project accounting. It is important to address leakage in bio-sequestration projects; this issue is further discussed for the bio-sequestration standards in chapter 5.2.1.

5.2 Project Types

Carbon offset projects can be grouped by type of project. Most projects may be broadly categorized into bio-sequestration, industrial gases, methane, energy-efficiency, and renewable energy projects. The following chapter discusses each project category.

Not all project types are equally effective at delivering the emissions reductions that they initially set out to deliver. The CDM keeps statistics on what percentage of projected emissions are realized in each project category (see Appendix C). No such statistics currently exist for the voluntary market.

5.2.1 Biological Sequestration

Forestry mitigation projects can make a "very significant contribution to a low-cost global mitigation portfolio that provides synergies with adaptation and sustainable development" (IPCC 2007, WGIII). Historic data indicate that cumulative emissions from land use changes, predominantly deforestation, have contributed about a quarter of all GHG emissions (IPCC Special Report on Land Use, Land-Use Change And Forestry).

Projects that aim to reduce GHG emissions from land use practices are collectively called *Land Use, Land-Use Change, and Forestry* (LULUCF) activities. There are three broad types of LULUCF projects:

- Those that avoid emissions via conservation of existing carbon stocks (i.e. avoided deforestation), called Reduced Deforestation and Degradation (REDD).
- Those that increase carbon storage by sequestration (afforestation and reforestation).
- Those that increase carbon storage by soil management techniques (e.g. no-till agriculture).

"Tree projects" have a natural appeal, since they conjure up images of pristine and healthy ecosystems. Yet the reality of LULUCF projects is far more complex. The amount of carbon sequestered by forests depends upon a number of factors including tree age, growth rate, local climate, and soil quality. Climate change impacts on forest health and the trees' ability to store carbon, as a result of increased temperatures, altered precipitation patterns, and changes in disturbance regimes (fire, insects, disease), are still largely unknown across the globe. Over time these uncertainties are expected to make the accurate measurement and calculation of LULUCF carbon sequestration projects more challenging and complex.

Leakage is of particular concern in LULUCF projects. Leakage is the unanticipated loss of carbon reductions outside the project boundary. For example, the reforestation of pastureland may drive local farmers to clear forests elsewhere for new pastures. Leakage can best be addressed through careful project design (e.g., incorporating project activities that reduce pressure on other lands), and any resulting leakage must be accounted for and subtracted if project calculations are to be considered credible and accurate.

Permanence is another issue that LULUCF projects must contend with. Permanence refers to the length of time that carbon will remain stored after being sequestered in vegetation. Forests can easily be destroyed by natural events such as fire, pests, or disease, or by illegal logging or burning. LULUCF projects can therefore only temporarily sequester carbon from the atmosphere.

Several trade offs exist in the design of effective forest management strategies which balance carbon storage along with a wide range of ecosystem services. Despite the fact that young forests have the greatest gross rate of carbon uptake, if an old growth forest is cut down and replaced with young fast-growing trees, it will take years to decades before the new forest will constitute a net carbon sink. This is because two-thirds of the carbon in terrestrial ecosystems is stored below ground. Clear cutting leads to large emissions of carbon from disturbed soils and debris decomposition. Projects that protect existing old growth forests are expected to provide the greatest carbon mitigation benefits (IPCC 2007, WGIII). Currently, emissions from deforestation are so great that stopping this emission source would have the greatest net impact on forest-related emissions.

Despite the importance of REDD (Reducing Emissions from Deforestation and Degradation), very few such projects have been implemented in the voluntary market, and CDM does not currently allow for REDD projects. The science to account for carbon storage in existing forests is very complicated. It can also be difficult to prove that the forest would have been cleared if it were not for the offset project, i.e. it may be difficult to prove the additionality of certain REDD projects.

Furthermore, it can be argued that deforestation is a demand-side problem, and that as long as the demand for biomass (fuel and timber) and land cannot be shifted and decreased, forestry offset projects in one area will only cause a change in the supply source rather than lower demand on the whole. In other words, none of the forestry standards are able to account for international leakage and market shifting. This argument holds true for certain sectors (e.g. timber demand) but may not do so for others, where good project design is able to affect supply and demand (e.g. by providing local livelihoods through sustainable harvesting, more sustainable and productive agriculture, increasing energy-efficiency and providing alternatives to wood fuel).

Over the long term, sustainable forest management strategies which aim to maintain or increase forest carbon stocks while providing ecosystem services and offering income for local communities will generate the largest sustained mitigation benefits (IPCC 2007, WGIII). Strategies that maximize both carbon storage and carbon uptake include protecting carbon rich old growth forests but allowing selective, well managed harvesting to increase carbon uptake of young trees, to create local economic opportunities, and to protect biodiversity.

Without doubt, exemplary LULUCF projects can address several global problems: they can sequester and store carbon, protect watersheds, offer economic opportunities for the local population, and conserve or restore biodiversity*. Conversely, poor-quality projects may result in a loss of biodiversity and the displacement of the local population. Although major international agreements call for integrated approaches to global problems (see section XX), there is little concrete guidance as to how to develop such holistic projects.

The currently available offset standards deal with the challenges of LULUCF projects in the following ways:

- Either excluding or strictly limiting LULUCF projects (Gold Standard, CDM)
- Imposing rules for LULUCF projects that specifically focus on maximizing biodiversity and social benefits (CCBS, Plan Vivo).

* Stephen Pacala and Robert Socolow calculate that over the next 50 years, we need to stop all clear-cutting in primary tropical forests, reforest or afforest 250 million hectares in the tropics or 400 million hectares in temperate zones. and plant 300 million hectares of new tree plantations. (S. Pacala and R. Socolow, "Stabilisation Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies," *Science*, 13 August 2004, Vol. 305, No. 5686, pp. 968–972.)

- Addressing issues of permanence by either issuing temporary offset credits (LULUCF CDM) or establishing carbon buffer zones which retain a portion of the project carbon credits and sales in case of forest loss and provide funding for reestablishment (VCS, Plan Vivo).

LULUCF projects have only reluctantly been included into the CDM and are currently excluded from the EU-ETS. As of early 2007, seven different afforestation/reforestation methodologies had been accepted by the CDM board. Yet of the total 827 projects registered in the CDM as of September 2007, only 1 is an afforestation/reforestation project (www.cdmpipeline.org/cdm-projects-type.htm).

Forestry and other land use projects play a much larger role in the voluntary offset market.

In 2006, forestry accounted for 36% of the transaction volume in the voluntary market (Hamilton, 2007). Yet there is a noticeable difference between forestry's role in the American and European markets. Forestry credits in the European market have decreased considerably due to concerns about additionality and a focus on clean technology investments. But forestry projects still play an important role in the American market. Two-thirds of the offsets that entered the voluntary market in the US in 2006 came from sequestration projects (Hamilton, 2007).

5.2.2 Industrial Gases

Some industrial gases have very high Global Warming Potentials* (GWP). The destruction of these gases is therefore a very effective way to reduce GHGs. Yet industrial gas offset projects are controversial because although they are the cheapest to conduct and generate large numbers of offsets, they do not contribute to the path to a low-carbon economy and deliver few additional environmental and social benefits.

Few disagree that these industrial gases should either be destroyed or not produced in the first place, but the offset market does not appear to be the best way to reduce these emissions†. Some reports have indicated that the creation of an offset market for HFC-23 gases has created perverse incentives in China and India to start building new HCFC-22 facilities‡ to increase revenue from offsets§. Many balk at the idea that heavily polluting industries such as these should be rewarded for the destruction of gases that should not have been produced in the first place (Financial Times, Jan 18, 2007). Furthermore, some research has shown that establishing an international fund to finance the capture and phasing out of HCFCs (via the World Bank, for example) would be much less expensive than reducing these emissions through the offset market (Wara, 2007¶).

Furthermore, although industrial gas projects can generate large emission reductions, these projects are high-tech end-of-the-pipe applications with limited employment and local environmental benefits.

To counteract some of this criticism and to support sustainable development initiatives, some project developers have chosen to invest a portion of their gains into local schools, health care systems, etc. For example, 65% of the revenue from CER sales in China is collected as tax revenue by the government and is supposed to be used to support sustainable development initiatives.

* Nitrous Oxide (N₂O, e.g. from fertilizer production) is 296 times, Hydrofluorocarbons (HFCs, used as non-ozone depleting refrigerants) thousands of times, and Sulphur Hexafluoride (SF₆, used in the electrical industry) more than 22,000 times more potent than CO₂.

† At a Montreal Protocol conference in the September 2007, 191 nations agreed to a faster phaseout of ozone-depleting chemicals than had originally been negotiated in 1987. Developed countries have agreed to reduce production and consumption by 75 percent by 2010 and by 90 percent by 2015 with final phase out in 2020 – 10 years sooner than the earlier agreement. Developing countries have agreed to cut production and consumption by 10 per cent in 2015; by 35 percent by 2020 and by 67.5 percent by 2025 with a final phase-out in 2030.

‡ HFC-23 is created as a by-product during HCFC-22 production.

§ E.g. Oeko Institute (2005) Implications of the CDM on other Conventions. The case of HFC-23 destruction, discussion paper. See also Warra, 2007.

¶ The cost to the developed world for installing technology to capture and destroy HFC-23 at the 17 production facilities in the developing world would be €100 million, compared to €4.7 billion in value for CERs generated under CDM through 2012, based on €10/tonne price of carbon at time of author's calculations, and neglecting taxes.

Current CDM rules prohibit new capacity at HCFC-22 plants from earning carbon credits, but the issue will be reconsidered at the next meeting of the UN Subsidiary Body for Scientific and Technological Advice in June 2008. A range of different solutions have been proposed. These include, among others, continuing the ban on including HFC-23 from new HCFC-22 plants, and a tax on carbon credits generated by newer refrigerant plants, the proceeds of which would be channelled into a clean technology fund to invest in renewable technologies.

The exclusion of new HFC facilities from the CDM market might have the unanticipated effect of creating a large supply of these offsets in the voluntary market. New HFC producing facilities, which are no longer eligible under CDM, could potentially flood the VER market with a large supply of cheap offsets.

Nevertheless, because of these controversies, some standards exclude industrial gas projects altogether. The Gold Standard does not accept any industrial gas projects. Of those standards that accept all projects types, VER+ excludes all HFC projects, while the VCS and the VOS exclude HFC-23 destruction credits from new HCFC-22 plants.

In the CDM market, 34% of all CERs transacted in 2006 came from HFC destruction projects, down from 67% in 2005. N₂O destruction projects accounted for 13% of offsets transacted in 2006 (Capoor & Ambrosi, 2007). Yet despite this trend, N₂O and HFC projects are projected to account for 50%* of all cumulative offsets sales under CDM by 2012. Industrial gas destruction accounted for 20% of VERs sold in the voluntary market in 2006 (Hamilton, 2007).

5.2.3 Methane Capture

Methane's global warming potential is about 21 times greater than that of CO₂. Methane is produced and emitted by landfills, during wastewater treatment, in natural gas and petroleum systems, by agriculture (livestock and rice cultivation), and during coal mining. Methane is natural gas and can therefore be captured and used as a source of energy.

There are two types of methane projects. The first type captures and flares methane. Through combustion, methane gas is turned into less potent CO₂ and H₂O. Examples of such projects include the capture and flaring of landfill gas and of coal mining gas. The second type of project captures methane and uses it to produce either hot water or electricity. Such projects include those that capture and purify methane in wastewater treatment plants or landfills and use it for electricity production or the production of another form of energy.

Biofuel plants that use agricultural or forestry waste to produce electricity also use methane – organic matter is anaerobically digested and the resulting methane is used to produce electricity – but such biofuel projects are considered renewable energy projects rather than methane capture.

It is usually quite easy to establish additionality for methane projects because there is generally no other source of revenue from the activity aside from the sale of offsets. Yet methane offset projects could create disincentives to regulate landfills and agricultural emissions (e.g. from manure lagoons). Once methane capture and destruction becomes profitable, there is little incentive for project owners to support legislation that would mandate capture and destruction from all such sources. Yet such regulation would likely cover more sources, and thus would decrease emissions directly without generating offsets that would allow buyers to increase their emissions. In other words, the climate benefits of such regulation could be greater overall. This issue of perverse incentives that could stifle more effective general regulation holds true for all offset types (see chapter 9).

In 2006, methane projects accounted for approximately 3% of VERs sold in the voluntary market (Hamilton, 2007). In the regulatory market, 8% of all CDM projects are methane projects. These projects accounted for 11% of CERs in 2006 (Capoor & Ambrosi, 2007.)

* <http://cdmpipeline.org>, accessed October 2007

5.2.4 Energy Efficiency

Energy efficient products or systems use less energy than conventional technology to perform the same task, such as a new car fleet that replaces old, less fuel-efficient vehicles. There is clearly great potential for energy efficiency projects (Weizsäcker & Lovins, 1997). Such projects are often quite cost effective because they save money over the long term through avoided fuel costs. In other words, such projects have a “payback”. Additionality tests for energy efficient projects must show that the revenue from the carbon offsets played a decisive role in making the projects viable.

Demand-side-management energy efficiency projects are held back by methodological challenges, such as additionality requirements for activities that are considered economically rational. Such demand-side energy efficiency projects are often small and disaggregated (e.g. distributing compact fluorescent bulbs or installing more efficient cooking stoves). Establishing a baseline, monitoring and evaluating energy efficiency projects can be challenging and labour-intensive. Consequently, such projects often have higher transition costs than large centralized offset projects*.

In 2006, energy efficiency projects made up 5% of offsets sold in the voluntary market (Hamilton, 2007). 9% of the CERs in 2006 came from energy efficiency and fuel switching projects. This is a large increase from 2005, when only 1% of the CERs originated from energy efficiency projects (Capoor & Ambrosi, 2007). Most CDM energy efficiency projects are implemented at large industrial facilities.

5.2.5 Renewable Energy

Renewable Energy (RE) projects include hydro, wind, and photovoltaic solar power, solar hot water and biomass power and heat production. Renewable energy projects are crucial for the long-term protection of the global climate because they help us move away from fossil fuel-based electricity and heat production to more benign forms of energy production. Although in theory this makes renewable energy projects ideal for the carbon offset market, it is sometimes difficult to establish the additionality of such projects.

Many renewable energy projects have high up-front capital costs. Legislative hurdles and local opposition can further complicate the implementation of such projects. Yet because most renewable energy projects have very low (biofuel) or no fuel costs (wind, solar, hydro), their operating costs are minimal once built.

As with all offset projects, additionality tests for renewable energy projects must determine that the projected revenue from the sale of offsets played a decisive factor in making the project viable. A lack of adequate additionality testing may be an issue when Renewable Energy Certificates (RECs) are converted to carbon offsets. Because RECs were created for a regulatory market with a cap, they are not designed to be tested for additionality (see Appendix A for a discussion on RECs).

Not all renewable power projects are benign. Hydro power projects in particular are controversial because they can have large negative environmental and social impacts. Several of the standards therefore require that hydro projects above a certain size comply with The World Commission on Dams (WCD) Framework. The WCD was an independent, international, multi-stakeholder process which addressed the controversial issues associated with large dams. Its final report, *Dams and Development: A New Framework for Decision-Making*, was released in November 2000. The report outlines a framework for decision-making based on five core values: equity, sustainability, efficiency, participatory decision-making, and accountability.

* To address this issue, the CDM has approved to use of a programmatic approach for certain projects: A programmatic CDM project activity is one in which the emission reductions are achieved by multiple actions executed over time as a result of a government measure or a private sector initiative. Examples include grant or soft loan programs to promote energy efficiency, fuel switching activities, and the use of renewable energies by private households, in the transportation sector or by small enterprises, as well as voluntary or mandatory efficiency standards for equipment or facilities.

In 2006, renewable energy projects made up approximately 33% of offsets sold in the voluntary market. Over half of those originated as RECs (Hamilton, 2007). In the regulatory market, 11% of all CDM projects are renewable energy projects, but only 4% of the CERs in 2006 came from RE projects (Capoor & Ambrosi, 2007).

5.2.6 TABLE 5: **Project Types Accepted By Each Standard**

Standard	Accepted Project Types
CDM	Any* except nuclear energy, new HCFC-22 facilities and avoided deforestation (REDD)
GS	Renewable energy (including methane-to-energy projects) and end-use energy efficiency. No large hydro above 15 MW
VCS	Any except projects that can reasonably be assumed to have generated GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction (e.g. new HCFC-22 facilities)
VER+	Any except any HFC projects, nuclear power projects and hydro power projects exceeding 80MW. Hydro projects exceeding 20MW with World Commission on Dams compliance only
CCX	Renewable energy, energy efficiency, HFC-23 destruction except from new HCFC-22 facilities, methane capture and destruction, forestry (including REDD) and agricultural practices
VOS	GS VERs: see above or CDM plus large hydro above 20 MW have to comply with WCD guidelines; no new HCFC-22 facilities.
CCBS	LULUCF
Plan Vivo	LULUCF except commercial forestry
GHG Protocol	Any
ISO 14064-2	Any

5.3 Project Location

Under CDM, offset projects can only be implemented in non-Annex 1 countries – countries that have no Kyoto obligation to reduce their emissions. There is high demand for projects implemented in the consumer’s home country. If these countries are signatories to the Kyoto Protocol and have emissions reductions requirements, then it is currently not possible to implement such projects without running into issues of double counting (see chapter 5.7.)

Carbon offset projects are implemented on all continents, yet there are some striking trends. China has been the single largest seller of CDM credits, accounting for 60% of the cumulative total. In 2006, 61% of all CERs came from projects in China, 12% from India, 10% from Latin America, and 3% from Africa[†] (Capoor & Ambrosi, 2007; see chart 4).

In the voluntary market, 43% of VERs came from projects in North America, 22% from Asia, 20% from Latin America, 6% from Europe and Russia, 6% from Africa, and 3% from Australia (Hamilton, 2007; see chart 5).

* Any project that reduced the emissions of one of the GHGs covered under the Kyoto Protocol: CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆

† Four UN agencies, the African Development Bank and the Worldbank have been implementing the Nairobi Framework since 2006 to help sub-Saharan Africa, to increase the number of CDM projects complementary to bilateral support of different donors. See http://cdm.unfccc.int/Nairobi_Framework/index.html

CHART 4: CERs Issues By Host Country and Region, 2006

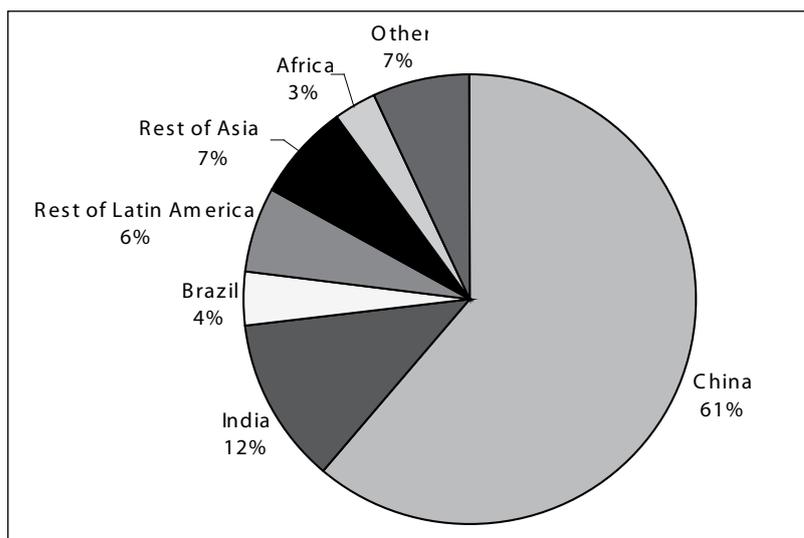
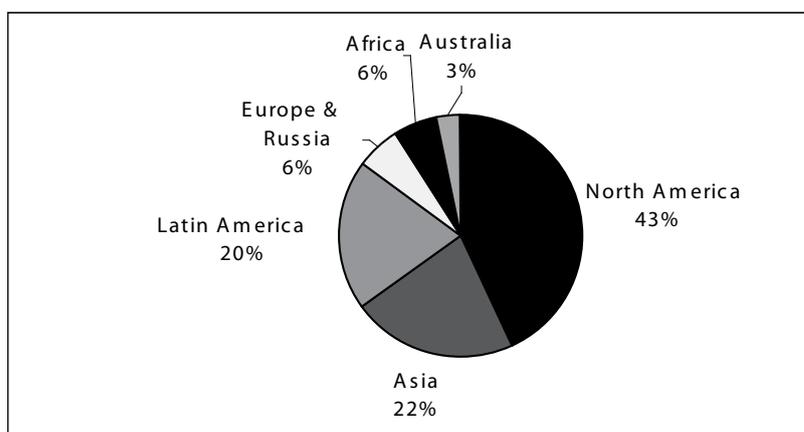


CHART 5: VERs Issues By Host Country and Region, 2006



5.4 Start Date & Crediting Period

The ‘start date’ in the context of a carbon offset project refers to either the start date of the project activity itself or the start date of the crediting period. The ‘crediting period’ is the period during which a carbon offset project can generate verifiable and/or certifiable emissions reductions credits. The project start date is one of the parameters used by all carbon offset programs to determine the eligibility of a project for consideration. For example, if a project started before 2000, it is considered non-additional under CDM. More significantly, the start date of the crediting period is used to determine the starting point for calculating the emission reductions achieved by a project.

Project Start Dates

Under CDM, the project start date is defined as “the date on which the implementation or construction or real action of a project activity begins” resulting in actual GHG reductions or net GHG removals in the case of forestry carbon sequestration projects. The Gold Standard uses the same definition as CDM. The VCS 2007 defines the project start date somewhat differently as “the date on which the project reached financial closure.” While other schemes do not explicitly define project start date, they do specify earliest possible start dates for projects. For the purposes of accounting emissions reductions, the relevant start date of a carbon offset project is the date when the project starts to reduce or remove GHG emissions.

Standards specify the earliest possible start date of a project to limit the number of already implemented projects entering the pipeline. Such projects may be additional, but proof of

additionality is more difficult to establish with projects that were fully implemented years ago. The rules on start date vary somewhat across standards (see table 6).

Crediting Period

Start and end dates

The start date of the crediting period can be any date after the project start date provided the project starts after it has been registered. If the project start date is earlier than the registration date, then each programme has somewhat different rules that govern the determination of the earliest start date of the crediting period (see *retroactive and CDM pre-registration crediting*). The end date of the crediting period is either the maximum permissible duration of the crediting period (see *duration and renewals*) or the end of the project itself. The end of Kyoto Protocol crediting period, 2012, acts as the *de facto* end date for the CDM programme, and the VER+ programme links the end date to the Kyoto expiry date until a post-Kyoto regime has been established, at which point the crediting period for projects can be extended.

Retroactive and CDM pre-registration crediting

CDM no longer allows retroactive crediting*, but most of the voluntary schemes do allow it. For example, the earliest start date for retroactive crediting under the Gold Standard is 1 January 2006 and 28 March 2006 for the VCS. VER+ allows retroactive crediting up to 2 years before the registration of the project. Thus, CDM project developers can sell their CDM pre-registration credits in the voluntary market as VERs, in effect extending the total crediting period (see discussion below). The prices of VERs are usually much lower than the prices of CERs, but, they do remain an additional revenue source for project developers. Notwithstanding the benefits to project developers, the sale of CDM pre-registration credits does call into question the additionality of these CDM pre-registration credits, since the project was deemed additional yet profitable without the revenue of the CDM pre-registration credits.

Duration and renewals

The duration of the crediting period varies based on either project types or whether they are renewable or not. Most programs only distinguish between LULUCF projects and all other project types in specifying the eligible crediting periods. The CCX is the only exception in that it specifies different crediting periods for different project types. The permissible crediting periods across schemes range from 4 to 25 years for standard projects and from 20 to 100 years for LULUCF projects (see table 6). The justification for generally longer crediting periods for sequestration projects is to enhance their viability.

There is a trade-off between limiting crediting periods to the minimum to allow more projects to enter the market and extending it to the maximum to make more projects viable. Longer crediting periods will result in fewer projects being implemented: For example, if we assume that three identical offset projects under a 10 year crediting period meet the demand for all offsets in this hypothetical example, a 15 year crediting period will deliver the same number of offsets with just two of the three projects. In other words, longer crediting periods increase supply without increasing emissions reductions.

Further, having longer crediting periods under some standards enables a project developer to potentially register the project first under one standard (e.g. with a 10 year limit), and after the end of its crediting period, switch to another standard (e.g. with a 15 year limit) for the remaining time (in this example, 5 years). This raises potential additionality issues.

* Projects that started between 1 January 2000 and 18 November 2004 (the date of registration of the first CDM project) could claim retroactive credits provided they submitted the projects for CDM registration by 30 April 2007 and provided that the project was validated before 31 December 2005.

5.4.1 TABLE 6: **Start Dates and Crediting Periods for Each Standard**

Standard	Project Start Date Rules	Crediting Periods Fixed/ Renewable	CDM Pre-registration Credits
CDM	Originally: 1/1/00, This rule has elapsed Currently: date of registration	10 yrs/ 3x7 yrs LULUCF: 30 yrs/ 3x20 yrs	Not allowed
GS	For Gold Standard CERs: as CDM For Gold Standard VERs: Maximum 2 years back from the date of GS registration; with earliest start date being 1 January 2006	10 yrs/ 3x7 yrs	Allowed for up to 1 year before CDM registration if the project is submitted for validation before January 31 st 2008 and meets certain criteria
VCS	1/1/02; after 19/11/08: start date must be within 2 years of present date	3x10 yrs AFOLU: 20-100 yrs	Allowed. No further additionality proof required.
VER+	1/1/00; issues credits up to 2 years back from date of registration. This rule expires in 2009.	Extension possible up to 25 yrs for standard projects and 50 yrs for LULUCF projects	Allowed for the period between PDD publication in the Global Stakeholder Process and UNFCCC registration. No further additionality proof required.
CCX	Landfill methane & renewable energy: 1/1/99 Forestation & forest enrichment: 1/1/90 Destruction of HFC: 1/1/07	Renewable Energy: 6 years Soil Carbon: 5 years HFC: 4years All other projects: 8 years	Allowed. No further additionality proof required.
VOS	Same as CDM	As CDM or as GS VERs	Allowed. No further additionality proof required.
CCBS	No Start Date	N/A	N/A
Plan Vivo	No Start Date	Varies project-by-project; 5-15 years.	N/A
GHG Protocol	N/A	N/A	N/A
ISO 14064-2	N/A	N/A	N/A

5.5 Co-Benefits

5.5.1 Sustainable Development Criteria

In the offset industry, people like to talk about ‘gourmet offsets’ versus ‘minimum standard offsets.’ A minimum standard makes sure that offsets are real, not double counted and additional. Gourmet offsets are those that are sourced from projects that adhere to strict additionality standards and have strong social and environmental benefits (so called *co-benefits* or *secondary benefits*). Such offsets often fetch a considerably higher price in the voluntary carbon market.

The distinction between ‘minimum standard’ and ‘gourmet’ offsets is to some extent a useful shorthand, yet it also reveals that sustainability and development benefits are no longer seen as an integral requirement for a carbon offset. This holds true for the compliance market as well as the voluntary market. Yet the carbon offset mechanism was originally conceived as a mechanism that would not only yield climate benefits but also include co-benefits.

As the word 'Development' in the Clean Development Mechanism indicates, when CDM was approved by developing nations, it was specifically because offset projects were not only to provide cost-effective reductions for Annex 1 countries but also development benefits for the host countries. In other words, to qualify as a CDM project, the original intention was that a CDM project must not only have carbon benefits but also development benefits. This two-fold goal is still included in the CDM guidelines (Article 12 of the Kyoto Protocol).

In practice, however, the CDM has failed to consistently deliver such development and sustainability benefits. What anecdotal evidence has indicated for a while is corroborated by recent scientific analyses: A literature review (Holm Olsen, 2007) concludes that there is a trade-off between the CDM target of supplying cheap emission credits and the promotion of sustainable development, and that the former goal has taken precedence. Another study (Sutter and Parreño, 2007) evaluated registered CDM projects and concluded that none of the 16 analyzed projects score high on sustainability and "likelihood of real emissions reduction" simultaneously. They find that the large projects in their sample have a low sustainability score and that over 95% of reductions come from projects with a low score.

Authors' Comments

We would argue that removing the development goals from the requirements of a voluntary offset standard undermines the original goal of carbon offsetting as defined by CDM, and gives credence to the critics who claim that carbon offsetting enables rich countries to take advantage of cheap business opportunities in developing nations that lead to no improvements for the local population.

Persistent criticism of the market could seriously hamper the growth of the voluntary offset market. Removing the development requirement could communicate to the consumers and to the public at large that the development benefits are a 'gourmet' attribute, a luxury add-on that is only for those offset purchasers who can afford to pay a premium.

Yet in reality, these development benefits are not just charitable contributions from the North to the South, but are essential in achieving climate protection. Responding to the world's main development challenges, 192 United Nations member states agreed in 2000 to actively support the Millennium Development Goals (MDG) – which range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015. The MDGs include an eight-goal action plan.* Two of the action items target energy and resource planning and collaboration between developed and developing countries and therefore directly relate to climate mitigation and adaptation. Many governments have recognized that the success of the MDGs will depend less on direct foreign aid, than on integrating the goals into all trade and investment policies and agreements.

Carbon offset standards that solely promote cost effective climate mitigation projects and do not deliver other sustainability benefits such as employment creation and reduction in air pollution do not support the MDGs. To truly impact the carbon market and to support projects that are sustainable on many levels, a standard must include additional sustainability and development goals.

* The eight action items are as follows:

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria, and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development, see: <http://www.un.org/millenniumgoals/>

It is important to recognize that there is often a trade-off between maximising emissions reductions and increasing sustainability benefits. Projects that work on the grass-roots level and involve local populations are often small-scale and require much continuous support, capacity building and follow-up. Such projects are not primarily about maximizing emissions reductions but about providing financial alternatives to projects with high sustainability benefits.

Several initiatives are underway to support the growths of CDM projects with true development and sustainability benefits. Two UN initiatives focus specifically on linking development goals with carbon offset and energy projects:

MDG Carbon Facility

The UN Development Programme, recently established its *MDG Carbon Facility* with the goal of:

Broadening access to carbon finance by enabling a wider range of developing countries to participate, particularly those countries which are presently under-represented. Promoting emission reduction projects which contribute to the Millennium Development Goals ("MDGs"), yielding additional sustainable development and poverty reduction benefits.

<http://www.undp.org/mdgcarbonfacility/>

The MDG Carbon Facility is a joint project between UNDP and Fortis Bank. UNDP offers project development services, including performing due diligence, providing technical assistance for CDM or JI project approval, and establishing the monitoring system for the project's emission offsets. Each prospective project is assessed against criteria in five main areas: carbon potential, technical feasibility, finance and legal issues, MDGs and the environment, and country risk.

UNDP charges a flat-rate cost-recovery fee for these services. Fortis provides carbon banking services, comprised of purchasing and marketing the emission offsets generated by the projects.

CD4CDM

The *Capacity Development for the Clean Development Mechanism (CD4CDM)* project was developed by the United Nations Environment Programme (UNEP) with financial support from the Dutch government. CD4CDM was established to promote GHG emission reduction projects that are consistent with national sustainable development goals, particularly projects in the energy sector. CD4CDM gives guidance to participating developing countries about the opportunities offered by CDM projects, and helps these countries develop the necessary institutional and human capabilities to plan and implement projects under the CDM (see <http://cd4cdm.org>).

Several of the voluntary standards also focus on strengthening the cobenefits of carbon projects.

The Gold Standard (GS) was developed by a group of environmental and social non-profit organizations to strengthen the social and environmental benefits of carbon offset projects. The Gold Standard can be used for voluntary as well as CDM projects. It has a very well developed stakeholder process and stresses environmental and socio-economic co-benefits for the host communities.

The **Climate, Community & Biodiversity Standards (CCBS)** focuses exclusively on bio-sequestration projects and emphasizes the social and environmental benefits of such projects. CCBS is a project design standard and offers rules and guidance for project design and development. It has a very well developed stakeholder process and stresses environmental co-benefits.

Plan Vivo is a standard for community-based agro forestry projects and focuses on promoting sustainable livelihoods in rural communities.

5.5.2 Stakeholder Consultations

Stakeholders are individuals or organizations that are in some way affected by the project. In the case of a wind farm, for example, stakeholders include the project owner, the wind turbine supplier, the employees, the municipality, nearby inhabitants, and banks.

Stakeholder consultations are an important tool to minimize possible negative impacts of carbon offset projects. Because many offset projects are being carried out in countries where regulations are routinely poorly enforced, stakeholder consultations also function as a risk management tool. When regulations are poorly enforced, an investor is unable to tell whether appropriate due diligence has been carried out with respect to local environmental impacts, land rights or labour issues. Embedding stakeholder consultation in the project approval process is therefore a way for investors to gain more assurance that violations of either their investment principles or of local legislation are not taking place. In China, for example, stakeholder consultation is being prioritised by the government as a tool to improve enforcement of environmental legislation at the local level.

The evaluated offset standards require stakeholder involvement to varying degrees and also differ in terms of how specific the stakeholder involvement rules are spelled out. The CDM rules are quite general and require relevant local stakeholders to be consulted via “appropriate media.” The validator (DOE) needs to confirm that relevant stakeholders have indeed been consulted with appropriate media and that comments from local stakeholders have been appropriately taken into account during the validation. It is ultimately up to the DOE to judge whether local stakeholders have been consulted appropriately. Some countries require certain local stakeholders to be consulted as part of their regulation to obtain a construction license or the approval of the environmental impact assessment. Some countries, such as Brazil, have clearly defined rules as to which stakeholders have to be consulted.

Of the reviewed standards, the Gold Standard most proactively spells out stakeholder rules. The Gold Standard tries to ensure transparency and participation with clear rules as to what media is to be used, what type of information is to be presented, and what questions are to be asked of local stakeholders. For example, the GS details the documentation that needs to be made available to local stakeholders along with a questionnaire for the stakeholders to fill out. It also requires an additional local stakeholder consultation for CDM projects (i.e., once the PDD is finalized and the comments from the initial stakeholder consultation have been taken into account).

5.5.3 TABLE 7: **Co-Benefit Requirements for Each Standard**

Standard	Environmental Requirements	Social Requirements	Comments
CDM	Negative environmental impacts must be stated in the PDD and minimized.	The Kyoto Protocol requires that CDM projects enable developing countries to achieve sustainable development. Stakeholder consultation is required at initial project planning stage.	The sustainability criteria for CDM projects are developed by each individual host country and therefore vary. If required by the host country, an Environmental Impact Assessment (EIA) has to be done and findings included in the PDD.
GS	Must demonstrate environmental benefits. Major negative impacts that cannot be mitigated lead to project disqualification.	The project must demonstrate social, economic or technical development benefits. Major negative impacts that cannot be mitigated lead to project disqualification. Stakeholder consultation required at initial project planning stage. There are specific requirements as to which stakeholders have to actively be invited. Two public consultation rounds are required before validation is completed. There is a 60 day commenting period for stakeholders in parallel to validation process. For Gold Standard VER, no public international stakeholder consultation such as for CDM is required. NGO supporters of the Gold Standard must be included in all consultation rounds.	The Gold Standard provides a set of sustainable development indicators to support project developers' efforts to define and assess co-benefits. EIA requirements are the same for CER and VER. The Gold Standard provides detailed documentation on how a stakeholder consultation has to be conducted and which requirements apply. The Gold Standard rules are more specific than under CDM. Micro-scale projects need only one stakeholder consultation round. The claimed co-benefits and impact mitigation measures must be monitored.
VCS	Must comply with local and national environmental laws.	The project document must include "relevant outcomes from stakeholder consultations and mechanisms for ongoing communication." (VCS 2007, p. 14)	If required by the host country, an Environmental Impact Assessment (EIA) has to be done.
VER+	Negative environment impacts must be stated in the PDD and minimized.	Local stakeholder consultation required only - if required by national law of host country or - if project proponent cannot demonstrate that the project does not impact the vicinity.	If required by the host country, an Environmental Impact Assessment (EIA) has to be done.
CCX	Must comply with local and national environmental laws.	Must comply with local and national laws.	If required by the host country, an Environmental Impact Assessment (EIA) has to be done. For agriculture, land-use and forestry projects the proponent must identify potential negative environmental and/or socio- economic impacts and take steps to mitigate them.
VOS	Same as CDM or GS	Same as CDM or GS	Same as CDM or GS
CCBS	Must demonstrate environmental benefits. Major negative impacts that cannot be mitigated lead to project disqualification.	Must generate positive social and economic impacts. Stakeholder involvement is required and must be documented. 21-day public commenting period.	Extra points are given for positive environmental impacts such as use of native species and biodiversity protection. Extra points are given for capacity building and use of best practices in community involvement. The CCBS is intended to be applied early on during the project design phase, which is when the environmental and social outcomes are often "locked in".

Standard	Environmental Requirements	Social Requirements	Comments
Plan Vivo	Must demonstrate environmental benefits.	Must demonstrate social benefits. Projects are required to increase capacity over time and promote extra activities contributing to well-being (e.g. micro-enterprises, fuel-efficient stoves etc.)	The Standard Manual includes explicit requirements for ecosystem and livelihood benefits and is reviewed periodically
GHG Protocol	N/A	N/A	
ISO 14064-2	N/A	N/A	

5.6 Role of Third Party Auditors

5.6.1 Aligned Interests Between Buyers and Sellers

In a typical market, the competing interests of buyer and seller create checks and balances: Producers try to maximize both price and the number of items sold or services rendered, whilst buyers try to lower the price and minimize the number of products they must purchase to satisfy their need. This system of checks and balances does not function in offset trading – there is an inherent conflict of interest in the current market design. Although there is competition on pricing – the supplier (project developer/funder) wants high prices, the offset buyer wants low – since both the supplier and buyer of carbon offsets aim to maximize the number of offsets produced, there is a strong financial incentive for both supplier and buyer to overestimate the baseline scenario and thus artificially inflate emission credits to increase profitability*. The purpose of a free market is to enable dynamic innovation and entrepreneurship. Free markets are not designed to protect public goods. Neither suppliers nor buyers of carbon offsets can therefore be reasonably expected to act altruistically and conservatively estimate a project’s reductions, as this would directly translate into decreased profits. In a “normal” market, the seller faces this same incentive, but it is balanced by the buyer’s incentive to ensure that the offsets are not overestimated.

This inherent alignment of interests is a profound design flaw of project-based carbon trading systems, which can only to partly be mitigated by rigorous monitoring and third-party validation and verification of offset projects. Most standards do require third-party auditors. The following sections detail validation and verification as well as the role of third-party auditors.

5.6.2 Independent Validation of Project Activity

The validation process is initiated during the planning and early implementation phase of a project. It confirms the sound planning of a project developer and the compliance with the chosen offset standard’s rules and regulations. The project has usually not been implemented at this stage and the validation neither comments on the actual performance of a project nor certifies any emissions reductions.

Validation Process

An independent auditor reviews and validates the project design documents (PDD) and other project-related documentation such as construction licenses, environmental impact assessments and records from the stakeholder consultation meetings with local stakeholders. For CDM projects, the information in these documents is reviewed against CDM rules and regulations. In the voluntary market, the validation entails the comparison of the proposed project to the rules of the standard under which the project is implemented.

* This dynamic is to some extent mitigated by the buyers’ potential risk of damaging his reputation if he buys offsets from a project that might later be criticised for overestimating its credit reductions.

It is important to point out that a validation can only be as good as the standard which it follows. If the requirements of a standard are weak, e.g. if the baseline requirements are not rigorous and conservative, the validation will not rectify that but will simply confirm that the proposed project conforms to the requirements of the standard.

A validation process under CDM typically consists of the following three phases:

- *A desk review of the project design document:* The auditor reviews the PDD and other relevant documents and critically checks the assumptions and calculations given by the project developer.
- *Follow-up interviews with project stakeholders:* The auditor confirms elements from the project documentation during interviews with local regulatory bodies (e.g. that the project has complied with all local regulations) and the project owner (e.g. that sufficient training has been administered to the staff to run the project equipment professionally). The auditor also consults a selection of local stakeholders i.e. organizations or individuals other than the project participants that are affected by the project so as to confirm that their concerns have been taken into account.
- *The resolution of outstanding issues and the issuance of the final validation report:* Inconsistencies in the documentation or missing evidential documents are pointed out by the auditor and corrections requested. Only after all open issues are resolved will the final validation report be issued and the project recommended for registration.

Validation is an ex-ante confirmation that the project, if implemented according to design, will generate the expected amount of emission reductions and comply with rules and regulations. The final validation report does not confirm the amount of carbon reductions that will be generated. It is the later verification and certification process which confirms and certifies the actual emissions reductions.

Table 8 lists the validation requirement and the review process for each of the evaluated standards.

5.6.3 Monitoring and Independent Verification of Project Activity

Verification is an ex-post confirmation that the project was implemented and is performing according to design. Verification confirms and quantifies the amount of emission reductions.

Monitoring and verification standards are required to ensure that offset projects perform as expected.

Under CDM procedures, an accredited third-party auditor (Designated Operational Entity - DOE) must confirm that the claimed emissions reductions have actually occurred. To reduce conflict of interest, DOEs are not allowed to do validation and verification on the same project.

Verification is only as good as the accounting standards it verifies against.

Verification by itself cannot ensure high quality of the project because it only confirms that the methodologies and monitoring standards have been implemented according to what was specified in the validation documents. If these methodologies and monitoring standards are weak, the verification process will not rectify this. For example, in a land-fill gas project, a verification report will confirm if the emissions reductions were actually achieved to the extent they were estimated in the PDD. The verification report will not evaluate or reconsider the additionality requirements.

Verification In the Voluntary Market

The lack of third-party project verification by a certified and independent auditor is one of the biggest gaps in the current voluntary carbon offset market. Many project developers in the VER market do not use third-party verification at all but do the verification in-house. One of the reasons for this is that historically, project developers were the ones that knew most about the technologies they implemented and the circumstances of their projects. Early on, there simply

were not enough third-party verifiers with the necessary technical expertise available to allow for external verification. Self-verification does not necessarily indicate that such projects are of low quality, but there is clearly a strong incentive for the project developer to evaluate his projects in as positive a light as possible. Third-party evaluation therefore not only adds to the transparency of projects but also decreases the inherent conflict of interest in self-evaluated projects. Many of the voluntary offset standards have recognized the need for independent verification and require third-party auditors. Table 8 outlines the requirements for each standard.

5.6.4 Project Approval: Auditors or Standard Boards

Under the CDM, upon completion of the validation or the verification process, the DOE submits the documents to the CDM Executive Board who will then approve or reject the project. Many of the voluntary offset standards also require the use of third-party auditors for project validation and verification. In other words, it is the auditors themselves that approve the projects. This is problematic for the reasons explained in the next two sections.

5.6.5 Conflicts of Interest: Auditors and Project Developers

Under both the CDM and voluntary offset standards, auditors are generally hired and paid by project developers. This creates a conflict of interest because the auditor will need to be impartial, yet may want to generously overlook issues and overestimate emission reductions in order to keep the customer. The CDM has tried to address this conflict of interest by stipulating that auditors are not allowed to provide any consulting services to project participants:

The DOE [Designated Operational Entity – CDM approved auditor] shall work in a credible, independent, non-discriminatory and transparent manner. The structure of the DOE shall safeguard impartiality of its operations. If the DOE is part of a larger operation, the DOE shall clearly define the links with other parts to demonstrate that no conflicts of interest exists. The DOE shall demonstrate that it is not involved in any commercial, financial or other processes which might influence its judgment or endanger trust in its independence and integrity. (CDM modalities & procedures, Appendix A, paragraph 2)

In the CDM, the additional approval process through the CDM Executive Board adds a layer of quality control because it is not solely up to auditors to approve or reject a project.

Except for the Gold Standard and the CCX, the evaluated voluntary offset standards do not employ an additional approval process. Auditors themselves approve the projects. This lack of an additional approval process potentially exacerbates the conflict of interest for the project auditor.

In addition, the subjectivity that is inherent in any offset project validation process weakens the quality control function of the auditor. In every project review, there is a significant degree of subjective judgment involved. Auditors are paid by project developers and are given the power to make judgments about issues such as whether assumptions are “conservative”, whether a given barrier is substantial in a given country, whether a baseline and an additionality argument make sense, and whether data sources are legitimate.

To counterbalance these design flaws, many of the standards, including CDM, require a short public commenting period – for example, for review of the baseline documents and background information. It is nevertheless questionable whether these public commenting periods are sufficient to properly review the social and environmental consequences of projects.

5.6.6 Quality Control of Auditors

Under CDM’s accreditation standard,^{*} DOEs have to provide proof that they have the necessary competences to conduct project validation (e.g. experience and technical expertise with validating biomass plants). To ensure auditors’ quality, the CDM Executive Board has set up a regular

^{*} Procedure for Accrediting Operational Entities by the Executive Board of the Clean Development Mechanism (http://cdm.unfccc.int/DOE/cdm_accr_01.pdf)

surveillance system for DOEs, including on-site assessment of every DOE at least every three years. Furthermore, the CDM Executive Board is authorized to conduct “spot-check” activities (i.e. unscheduled surveillance) of DOEs at any time. Depending on the results of the spot check, the CDM EB can issue a warning to the DOE or in the most severe cases suspend its accreditation.

In 2006 the CDM EB conducted three spot checks, yet it did not suspend any DOEs or publish their names despite “several non-conformities of the DOE regarding both procedural and operational requirements”. Given the negative findings of all three spot-checks, the EB set up a regular surveillance system for DOEs, including on-site assessment of every DOE at least every three years.*

The voluntary standards evaluated in this report currently have no formal structures in place to assess and ensure the quality of the auditors’ work.

5.6.1 TABLE 8: *Validation, Verification and Third-Party Auditor Requirements*

Standard	Requirements for Validation	Validation Approval Process	Requirements for Verification	Verification Approval Process	Third-party Requirements
CDM	<p>Project Design Document (PDD) containing:</p> <ul style="list-style-type: none"> Description of the project activity; Information on baseline methodology; Crediting period; Monitoring methodology and plan; Estimation of GHG emissions by sources; Environmental impacts; Stakeholders’ comments; Host nation approval. 	<p>Validation documents need to be approved by the CDM Executive Board. After approval, the project is officially registered.</p>	<p>Monitoring report (by project developer) including estimate of CERs generated.</p> <p>Verification report (by DOE) and certification report (by DOE) confirming the emissions reductions.</p>	<p>Project developers monitor project according to monitoring plans as given in the PDD.</p> <p>Monitoring reports are submitted to third-party auditor (DOE). DOE writes verification reports which are then submitted for approval to the CDM Executive Board.</p>	<p>Validation and verification have to be done by third-party auditors (Designated Operational Entities, DOEs).</p> <p>To avoid conflict of interest, validation and verification cannot be done by the same DOE.</p>

* Details can be found: Executive Board of the Clean Development Mechanism Twenty-ninth Meeting (<http://cdm.unfccc.int/EB/029/eb29rep.pdf>)

Standard	Requirements for Validation	Validation Approval Process	Requirements for Verification	Verification Approval Process	Third-party Requirements
GS	All CDM requirements plus additional GS requirements must be met (e.g. GS eligibility, previous announcement, scoring of sustainable development indicators, monitoring plan for sustainable indicators, detailed outcomes of both stakeholder consultations) .	Validation documents need to be approved by the Gold Standard Technical Advisory Committee (TAC). Gold Standard TAC and Gold Standard supporter NGOs have six weeks to seek clarification and can request an in-depth audit of a project. After approval, the project is officially registered. Micro-scale projects can be submitted for an internal validation. Some are externally validated on a targeted random basis.	Monitoring report (by project developer) including estimate of CERs or VERs generated. Verification report including the GS-specific annex (including monitored sustain. dev. indicators) and statement (by DOE) confirming the emissions reductions and compliance of sustainable development indicators. Verification report including the GS-specific annex to be submitted to Gold Standard by CDM-accredited DOE. Gold Standard verification periods have to correspond to CDM verification periods.	Project developers monitor project according to monitoring plans as given in the PDD. Monitoring reports are submitted to third-party auditor (DOE). DOE writes verification reports. Gold Standard CER: submitted for approval to the CDM Executive Board and the Gold Standard TAC. Gold Standard VER: submitted for approval to the Gold Standard TAC. Micro-scale projects are selected to be verified on a targeted random basis. Both Gold Standard CER and VER: a 2-week review period precedes issuance during which the Gold Standard TAC and Gold Standard NGO supporters can ask for clarifications and corrective actions.	Registered DOEs DOEs conducting a first time validation of a Gold Standard PDD trigger a more in-depth audit of the project by the Gold Standard TAC, which also serves as accreditation procedure of the DOE to the Gold Standard. Validation and verification can only be done by the same DOE for small-scale and VER micro-scale projects.
VCS	The VCS Project Description (VCS PD), monitoring plan, environmental impacts, comments by stakeholders etc. are validated according to ISO 14064-3 requirements and VCS Programme requirements.	Validation documents are approved by the auditors. Validations are mandatory, and can be completed up front or at the time of the first verification.	Monitoring report (by project developer) including estimate of VCUs generated. ISO 14064-3 requirements using the VCS Verification Report template confirming the emissions reductions.	Project developers monitor project according to VCS PD. Monitoring reports are verified by third-party auditor. Auditor writes verification reports and also approves them and the emissions reductions. These are automatically approved by the VCS once authenticity and completeness of documents have been confirmed.	Registered CDM DOEs Certified auditors under ISO 140065 Auditors registered under JI Other auditors need to be certified by the VCS board.
VER+	Jl or CDM PDD plus formal statement of compliance with VER+ criteria	Validation documents are approved by the auditors.	Monitoring report (by project developer) including estimate of VERs generated Verification report (by auditor) confirming the emissions reductions	Project developers monitor project according to PDD. Monitoring reports are submitted to third-party auditor who writes verification reports and also approves them and the emissions reductions*.	Validation and verification have to be done by third-party auditors (DOEs). Validation and verification can be done by the same DOE

* DOEs have a "certification body" which reviews and approves the validation and verification reports. For CDM projects, the DOE certification body is the DOE's quality control before the documentation is submitted to the CDM EB. For VER project, it is that certification body that gives the final approval for a project.

Standard	Requirements for Validation	Validation Approval Process	Requirements for Verification	Verification Approval Process	Third-party Requirements
CCX	CCX does not distinguish between validation and verification.	See verification.	Project proposal Independent verification report confirming the emissions reductions.	Verification documents are submitted for approval to the CCX Committee on Offsets.	Third-party auditors are approved by CCX for each project type.
VOS	Same as CDM or GS	Same as CDM or GS	Same as CDM or GS	For GS VERs: see above. For other VERs: project developers monitor project according to PDD. Monitoring reports are submitted to third-party auditor (DOE). DOE writes verification reports and also approves them and the emissions reductions.	Same as CDM or GS
CCBS	Fifteen required criteria and eight optional “point-scoring” criteria. Project ratings: Approved, Silver, Gold.	The CCB Alliance works closely with auditors, but it is ultimately the auditor who makes the decision to approve or reject a project.	Project documents and monitoring results reviewed by auditors.	Each project must be verified at least every five years. Because CCBS is only a project design standard, it does not verify quantified emissions reductions.	Registered DOEs for ‘Afforestation and Reforestation’ and accredited FSC auditors. Validation and verification can be done by the same auditor.
Plan Vivo	Report including: Project description Communication with national regulatory authorities. Monitoring protocol Technical specifications Size of risk buffer Financial records	Validation carried out by expert reviewers. All documentation reviewed and approved by the Plan Vivo Foundation. Projects are reviewed on a yearly basis through annual reporting.	Verification is currently not required for Plan Vivo projects but recommended.	Because Plan Vivo sells ex-ante credits it does not verify quantified ex-post emissions reductions.	Approved validators with extensive experience in forestry and carbon management projects.
GHG Protocol	Requires monitoring plan but does not cover validation and verification	N/A	N/A	N/A	N/A
ISO 14064-2	Does not distinguish between, and does not require, validation and verification	N/A	N/A	N/A	No third-party auditor requirements; ISO certifies auditors under ISO 14065 and ISO 14066 (not yet released)

5.7 Registries

Carbon offset registries* keep track of offsets and are vital in minimizing the risk of double-counting (that is, to have multiple stakeholders take credit for the same offset.) Registries also clarify ownership of offsets†. A serial number is assigned to each verified offset. When an offset is sold, the serial number and “credit” for the reduction is transferred from the account of the seller to an account for the buyer. If the buyer “uses” the credit by claiming it as an offset against their own emissions, the registry retires the serial number so that the credit cannot be resold.

Registration and Enforcement Systems must include:

- A registry with publicly available information to uniquely identify offset projects.
- Serial numbers for each offset credit generated by each project.
- A system to transparently track ownership of offsets which makes it possible to track each offset to the project from which it originated.
- A system to easily check on the status of an offset (i.e., whether an offset has been retired).
- Contractual or legal standards that clearly identify the original “owner” of emission reductions.
- Contractual or legal standards that spell out who bears the risk in case of project failure or partial project failure (e.g. who is responsible for replacing the offsets that should have been produced by the failed project).

(Broekhoff, 2007)

Obtaining offsets directly through a registry simplifies the delivery process significantly, as buyers simply establish an account into which the registry transfers the purchased offsets. In so doing, the buyer is assured of both the quality of the purchased offsets (as only offsets that meet the registry’s standards are transacted) and their ownership of the offsets, since they are deposited directly into the purchaser’s account.

Under CDM, the certification process is the phase of a CDM or JI project during which permits are issued on the basis of calculated emissions reductions and verification. In the VER market, credits are not certified but solely verified -- thus the difference between CERs (Certified ERs) and VERs (Verified ERs.) The CDM registry is used to issue CERs from registered CDM project activities into the Pending Account. Up to date information on all registered projects can be found at: http://cdm.unfccc.int/Issuance/cers_iss.html. Entities authorized to participate in a CDM project activity by a Non-Annex I Party may apply for a permanent holding account in the CDM registry at the time of the first issuance of CERs for their CDM project activity. Entities authorized to participate in a CDM project activity by an Annex I Party may apply for a temporary holding account in the CDM registry. Registry-administered offsets transactions have the advantage of transaction credibility, protection against fraud and errors, and simplified facilitation of transactions based on established standards and procedures.

There is no one single registry for the voluntary market. Registries for the voluntary market have been developed by governments, non-profits, and the private sector. Some of the registries are tied to certain standards whereas others function independently. Most voluntary standard registries are still in the planning stage and not yet operational. Table 9 summarizes the registries and the approval process for each of the standards.

* The term ‘registry’ is somewhat loosely defined. It sometimes also refers to accounting systems that track greenhouse gas emissions and/or emissions reductions. In this section we focus solely on registries that are carbon credit accounting systems.

† The issue of ownership is not a trivial one: “For example, both the manufacturer and the installer of energy efficient light bulbs might want to claim the emission reductions caused by the light bulbs – as might the owners of the power plants where the reductions actually occur. Right now, establishing the right to an offset reduction largely consists of making public marketing claims and trying to exclude others from doing the same.” (Broekhoff, 2007)

When transactions occur without registry administration, providers and buyers must find other ways to ensure the integrity of the delivery process. Since offsets have no physical form, buyers must be given proof that the stated emission reductions have truly taken place. A verification report from an independent thirdparty can serve this purpose. Furthermore, buyers must obtain all rights and titles to the emission reductions and assurance that the provider did not and will not double-sell the offsets. This confirmation usually takes the form of a “transfer of title and ownership” document signed by the provider. However, unless the provider engages an independent third party to verify its internal processes, the buyer cannot be sure that the provider has truly retired the stated amount of offsets. This form of delivery is often time-consuming, may require extensive negotiations, and demands a great deal of know-how on the part of the buyer. It is therefore only suitable for deliveries of large quantities of offsets.

5.7.1 TABLE 9: **Registries Used by Each Standard**

Standard	Accepted Registries	Approval Process
CDM	CDM Registry	Verification documents need to be approved by the CDM Executive board
GS	Gold Standard Registry (currently under construction, predicted start date early 2008) For CERs: CDM Registry; GS-labeled CDM serial numbers will be tracked in the Gold Standard registry For VERs: Gold Standard Registry	Verification documentation for CER and VER projects are approved by the Gold Standard Technical Advisory Committee CERs are issued by the UNFCCC and the Gold Standard label is delivered by the Gold Standard VERs are issued by the Gold Standard
VCS	In the process of accrediting multiple VCS registries that are electronically connected and transfer data between each other in real time. All registries will be connected to a central VCS project database which is under development and aiming to launch in March 2008.	Verification documents are approved by the third party auditor.
VER+	Blue Registry of TÜV SÜD	Verification documents are approved by the third party auditor and then forwarded to BlueRegistry administration. All VER+ projects must be registered in the BlueRegistry.
VOS	Is planning to establish their own registry	For GS VERs: see above. For other VOS VERs: verification documents are approved by the third party auditor (DOE)
CCX	CCX Registry	Offset projects need to be approved by the CCX Committee on Offsets
CCBS	N/A	N/A
Plan Vivo	Plan Vivo Registry	Plan Vivo sells ex-ante credits (Plan Vivo Certificates) which are recorded in their own registry
GHG Protocol	N/A	N/A
ISO 14064-2	N/A	N/A

5.8 Double Counting

Some double-counting issues can be addressed through the use of a registry. A universal mandatory registry for all types of offsets could ensure that each offset is sold only once. Such a registry could also ensure that offsets are not also sold as other commodities, such as Renewable

Energy Certificates (RECs). But because multiple registries operate independently in the VER market, a project developer could potentially sell his credits through two different registries. Such fraudulent activity would not be possible if the market used a single registry, or several linked registries, but the differences between the current standards have made efforts to coordinate them so far unsuccessful.

Other double-counting issues are more difficult to address. For example, many customers want to buy offsets that come from projects implemented in their own country. Whereas the average European produces 11 tonnes of CO₂, and the average American produces 20 tonnes, the average Chinese or Indian produces just 4 or 2 tonnes respectively, so clearly there is a moral imperative for rich nations to reduce their emissions first. But while this seems logical, such a system turns out to be problematic because of double-counting issues.

Under Kyoto, 39 developed countries (called “Annex B countries”) adopted legally binding emissions reduction targets. If the offsets for a carbon project implemented in an Annex B country are sold in the voluntary market, the reductions will automatically be double-counted: the purchasing individual or organisation will claim them, but they will also be counted toward the host country’s greenhouse gas inventory. If a company funds an offset project in an Annex B country, the resulting carbon offsets would need to be retired from that country’s national greenhouse gas inventory in order to avoid double-counting. This matters because every Annex B country has to implement policies and projects to achieve their Kyoto goals, but to date no Annex B country has a regulatory system in place that would prevent this kind of double-counting. This means that voluntary offset projects in Annex B countries effectively replace another set of emissions reduction measures that the country would have had to take in order to meet its Kyoto requirements had the reductions not been double-counted*. This problem could be addressed if Annex B countries with emissions reduction obligations retired AAU credits for all VERs created through the voluntary market. Yet countries are unlikely to approve such a mechanism because it would mean that governments would indirectly endorse VERs. Once accepted as AAU equivalents, they would in effect be equivalent to CERs.

Paradoxically, in high-emitting countries that have not ratified Kyoto, such as the United States and Australia, these double-counting issues don’t exist at the national level. They do exist on a more local level, however: if a region, state, county, or city has enacted an emissions reduction target (even just a voluntary one), any emissions reductions that are created in that area but then sold as offsets in the voluntary market should not also be counted in that jurisdiction’s emissions inventory†.

* This is only true if the country has a serious commitment to meeting its emissions targets. Given the failure of many nations to stay on target with their goals, it could be argued that any emissions reductions are welcome and that voluntary actions do not replace mandatory action.

† Another type of double counting can occur with company-based trading schemes such as the EU ETS. In this case cancellation of AAU would be insufficient; cancellation of EUA would be required as well.

5.8.1 TABLE 10: **Project Locations and Rules on Annex B Countries for Each Standard**

Standard	Project Location	Rules to avoid double counting for projects in Annex B countries.
CDM	Non-Annex I countries	N/A
GS	Gold Standard CERs: Non-Annex 1 countries Gold Standard VERs: Any country	Retirement of corresponding amount of AAUs VERs: Retirement of corresponding allowances in capped countries
VCS	Any country	Retirement of corresponding amount of AAUs
VER+	Any country	Retirement of corresponding amount of AAUs (for projects carried out during commitment period) or if applicable: statement of country that AAU shortage exists not allowing International Emissions Trading; or statement of project participant, that VER+ will not be transferred out of the country.
CCX	Any country but member states of the EU-ETS	CCX does not allow for the registration of projects in Annex 1 countries during the Kyoto period that might be counted under the country level inventory (AAU).
VOS	Any country	Retirement of corresponding amount of AAUs
CCBS	Any country	Rules to be developed for CCBS (2008)
Plan Vivo	Developing countries	N/A
GHG Protocol	N/A	N/A
ISO 14064-2	N/A	N/A

6. Offset Transactions

In the absence of predominant market standards, the variety of offset prices, qualities, delivery conditions and contract terms makes it difficult to get a clear overview of the voluntary offset market. The following clarifies pricing, costs, risks and delivery terms within the market mechanisms.

6.1 Pricing of Offsets

A complete and correct assessment of the production costs of an offset requires extensive knowledge of investment costs, operational costs, past, present and future project performance, corporate finance, and risk management, among other factors, and is extremely time-consuming. Few consumers have the time and know-how to conduct such extensive analyses. Even those that do may find it extremely difficult to factor all cost components correctly.

6.1.1 Project Costs

Offset providers must cover costs incurred at many different stages of project implementation before the emission reduction can be sold as an offset. The main cost factors can be divided into:

- Project cycle-related costs: investment for technological implementation, financing of investment capital, costs for technical project operation, maintenance, administration, etc., and

- Delivery process-related costs: costs for the management of project failure risk, quality control, administration, legal, printing costs, etc.

These costs have an indirect influence on the market price of offsets: in a functioning market where rigorous and transparent standards are available, prices are set by supply and demand. Offset providers whose efficient projects and internal processes enable them to generate offsets below market prices will be most successful. Providers whose generation costs exceed market prices, on the other hand, will need to increase their prices, which may result in decreased sales.

The cost of each aspect of production varies from project to project, so no rule of thumb exists for predicting the generation cost of an offset. The cost can be as low as two Euros per offset (typically in projects at large chemical plants), but has no upper limit. Some projects incur costs of € 20 per offset and more, not including delivery process-related costs. The generation costs for some offsets exceed resale prices as early as in the planning stage. Other projects reach equivalent cost levels due to technical failure or generation shortfall.

Since no for-profit organisation can sell offsets below production costs over the long term, less cost-efficient projects are typically implemented with funds donated to non-profit organizations. Such projects may in turn have high co-benefits which have no assigned monetary value in the current carbon markets, in which the traded commodity is a CO₂e reduction.

6.1.2 A Common Misunderstanding: The “Project Share Pitfall”

Buyers of offsets are inclined to pay the lowest possible price for offsets of a given quality, and are not willing to pay for a provider’s unreasonable profit or other unwanted expenditures (e.g. project administration or taxes). In comparing different offset purchase offers, buyers often try to invest in projects with high project share – that is, the proportion of the investment that goes toward direct implementation costs as opposed to overhead and organizational costs. Many buyers prefer offsets with a high project share because they believe this indicates a more significant contribution to climate protection.

But the project share measure can be manipulated, and is subject to individual assumptions and definitions:

- a) There is no agreed-upon method for calculating project share, so different providers may include various costs in their calculations. Internal administration costs to the provider, for example, may or may not be included in the administration costs for a specific project.
- b) Purchasing offsets with a high project share that are significantly more expensive than other offsets may not be the most effective use of available funds, since the same funds could be used to achieve more emissions reductions at a lower price.
- c) Even if two projects have the same project share in the planning stage, the projects’ generation success (and, therefore, climate impact) may differ significantly. The overall project share may be known only after successful long-term project operation.
- d) Some projects are easily constructed but difficult to administer, while the opposite is true for others.

Most buyers aim to maximize the emissions reductions they are funding. But project share is often an unreliable measure for evaluating and comparing the quality and effectiveness of offset projects.

6.2 Offset Market Prices

It is nearly impossible to give a precise overview of current offset market prices, as the market is considerably fragmented due to the variety of available standards, project types and locations, offset qualities, delivery guarantees, contract terms and conditions, etc. That said, the main price drivers are an offset’s standard and origin (i.e. project type).

In a competitive market, offset prices are a function of supply and demand. The attractiveness of a project depends on the buyer's objectives. These are different for a compliance buyer than for a voluntary buyer:

- Compliance buyers are interested in obtaining credits reliably and cheaply in order to fulfil their regulatory requirements.
- Most institutions that voluntarily use offsets for their climate neutralization efforts want to communicate that effort to the public and choose projects that are well-received by the target group.
- In Europe, voluntary buyers are especially interested in biomass, renewable energy and end-user energy efficiency projects from less developed countries. Other emissions reduction projects such as industrial gas projects at chemical plants are less attractive to these buyers because, despite their emission reducing capability, such projects deliver very limited co-benefits such as job creation and protection of local ecosystems.
- In the US, voluntary buyers prefer offsets generated by domestic projects, and are less focused on project type or sustainable development components.

Carbon markets are still in their infancy. As public opinion and understanding of the markets increase, different project attributes may become more attractive to buyers. The following market prices* are only approximations, and do not reflect the full variety of the purchase and sale preferences of all market participants.

6.2.1 TABLE 11: **Pricing of Offsets for Each Standard**

Standard	Pricing
CDM	The wholesale market price for CERs is at around € 18.† A seller therefore has the possibility to sell the CER to a compliance customer at that price using a standardized and cost efficient process and will sell to other buyers only, if any additional administration costs are covered by additional revenues. Additional costs apply for marketing expenses, certificate management, administration, value added tax etc. Therefore, CERs are sold in the area of € 14 to € 30.
GS	GS CER or GS VERs are sold on average at a premium to regular CERs or comparable VERs of 5-25% of the market price. The premium varies depending on a number of factors: the project itself (its attractiveness for communication for example), project location (projects in so called least-developed-countries for example, are much sought after), whether a trade happens in the wholesale or in the retail market, vintage etc.
VCS	VCU prices depend to a large extend on the project type. VCS version 1 VCUs are traded at € 5 to € 15.
VER+	VER+ offset prices depend to a large extend on the project type and are traded at € 5 to € 15.
VOS	GS VER: see above Other VOS VERs: prices depend to a large extent on the project type. They trade at a premium compared to other VERs, but at a lower level than GS VER levels.
CCX	CCX offsets are traded at €1.2–3.1.‡ Additional costs apply for exchange fees, marketing expenses, certificate management, administration, providers profit, value added tax etc. and resale prices will usually be higher than the price listed on the exchange.
CCBS	Offsets from CCB projects are traded at €5 - €10.
Plan Vivo	The price of Plan Vivo Certificates depends on the volume of the purchase and the project. Plan Vivo certificates are traded at €2.30 - €9.50 / tCO ₂
GHG Protocol	N/A
ISO 14064-2	N/A

* "State of the Voluntary Carbon Market 2007 – Picking Up Steam", Ecosystem Marketplace & New Carbon Finance, 17th July 2007 and Tricorona, November 2007

† Nordpool price, 14th November 2007: € 17.70

‡ Pricing data from October 07-February 08; <http://www.chicagoclimatexchange.com/market/data/summary.jsf>

6.3 Choosing the Right Contract Terms

In the offset market, as in most other markets, participants compete to secure market shares. In order to do so, providers of a certain offset quality (e.g. Gold Standard CERs) must set prices at competitive levels. This requires efficient project operation on the part of the provider, as well as limited profit margins. A provider of offsets with profitability expectations substantially above the competition will set their prices too high and as a consequence lose market share. On the other hand, a provider pricing offsets too low without looking at all of the applicable risk and cost components runs the risk of bankruptcy – especially in case of project shortfall or failure.

Yet the market can only function successfully if reliable information is available about the quality of offsets. Otherwise, the markets will fail to ensure quality and efficiency. For example, if non-additional offsets enter the market and are indistinguishable from additional offsets, a market driven race-to-the-bottom will occur, since the non-additional offsets will by definition be cheaper than the additional ones. Standards must fulfill the role of ensuring quality and providing transparent information to buyers and sellers. If reliable standards are available to distinguish the different types and qualities of offsets, buyers can take advantage of the competition in the offset market by comparing prices for products of a desired quality.

Comparing offsets is no simple task. Buyers must take into consideration project type, offset standard, delivery guarantee, and other factors. Ideally, by choosing offsets offering the best value among those of similar type and quality, the consumer fuels market competition, which in turn results in more efficient emission reduction activities.

Among the most important contract parameters are the delivery provisions, which are specified in the contract between buyer and seller. In order to choose the product that best fits their needs, it is crucial that buyers understand the terms of the contract and the delivery terms and risks involved.

The cost of purchasing *guaranteed* offsets, for example, may be more than that of buying *intended* emission reductions, even if the offered offsets are of the same quality. Guaranteed reductions have either already occurred (**prompt delivery**) or will occur in the near future and are guaranteed to be delivered (**forward delivery**). In the latter case, the provider is held liable for contract default if they fail to deliver the agreed-upon number of emissions reductions. In cases where buyers donate toward *intended* emission reductions, project shortfall or failure has no consequences for the offset provider. Such *intended* emission reductions are referred to as **forward crediting** or **ex-ante credits**.

Some buyers may prefer to make a donation toward intended reductions based on personal preferences, especially if a project delivers high co-benefits. Others may prefer the certainty of achieved emission reductions associated with purchasing guaranteed offsets.

All but one of the reviewed full-fledged standards verify exclusively ex-post emissions. For such offsets, it is up to the buyer and seller to choose between prompt delivery and forward delivery. Plan Vivo is the only standard that verifies ex-ante credits. But not all providers clearly distinguish between non-guaranteed ex-ante credits and guaranteed offset purchases. For example, a provider could advertise to sell Gold Standard offsets from projects that have not yet produced verified emissions reductions. If this is not clearly communicated to the buyers, they might be unaware of the risk they are taking. It is therefore vital that the buyer reads the general terms and conditions of the contract and identifies if the purchased amount of offsets is backed by real emission reductions or not. The following sections describe the three levels of delivery risk in broad terms. Though single contracts may deviate from this scheme, the underlying principles generally hold true.

6.3.1 Low Transaction Risk: Prompt Delivery of Existing Offsets

Prompt delivery in the carbon markets typically means delivery within a few days of contract signature. This delay allows for administration of the actual transaction, but not for the generation of offsets, which would be impossible in such a short time.

In such cases, the provider assumes all project and price risks and generates the carbon offsets prior to selling them. The provider invests in the necessary technology, oversees project implementation, covers the operational project expenses, and pays the costs for the validation, registration and verification of the project activity. The provider does so without knowing for certain how large a volume of offsets the project will ultimately generate, nor at what price these offsets may be sold. However, after successful project operation, having the carbon offsets in stock enables the provider to offer risk-free deliveries, and to achieve a higher nominal sales price than could be set for high-risk (non-guaranteed) offsets.

Since providers of promptly delivered offsets can specify and easily guarantee the exact amount, quality and parameters of their products, buyers of such offsets carry no project-related risks. Thus, this type of contract is suitable for buyers that wish to receive risk-free emission reductions quickly.

6.3.2 Medium Transaction Risk: Forward Delivery of Future Offsets

A forward contract constitutes a binding agreement between the offset provider and the buyer to deliver emission reductions at a pre-defined time and price. The provider may have access to future emission reductions from a certain project or portfolio of projects or may have existing emission reductions available in stock.

For both the provider and the buyer, a forward contract is a way to eliminate market price risks and secure a desired transaction price, even though delivery may not occur for months or years. Such an arrangement protects the provider from falling market prices, and the buyer from rising market prices.

Forward contracts may specify a fixed or proportional amount of offsets to be delivered. A fixed delivery quantity specifies the exact amount of offsets to be delivered, while a relative number typically refers to the project's overall success (e.g. buyer agrees to buy 50% of all generated offsets each year for 3 years).

In fixed volume transactions, the seller carries the risk if the project produces fewer offsets than expected. In case of an offset shortfall, the seller must make up the missing offsets by delivering offsets from other projects at the same price.

A forward contract can be executed only if both parties still exist at the time of delivery (i.e. have not suffered bankruptcy). If the seller is unable to meet their contractual obligation, the buyer faces the risk of having to pay the current market price for offsets, which may be more than they had originally settled on with the forward contract. The risk of a party not being able to fulfill its contractual commitment is referred to as credit risk. Before signing a forward contract, each party typically assesses the credit risk of the other party.

While organizations applying professional risk management strategies may prefer forward deliveries to eliminate market price risks, such arrangements are less suitable for consumers who do not know how to assess credit risk. Forward contracts are most suitable for buyers who want to secure a price ahead of actual delivery and payment date (e.g. buyers who expect market prices to increase in the future).

6.3.3 High Transaction Risk: Forward Crediting of Ex-ante Offsets

Forward crediting – the sale of ex-ante credits – is the most complicated type of transaction for the buyer to understand. Typically, at contract closure, the buyer pays the purchase price for a certain number of offsets that have yet to be produced, and the provider delivers a certificate confirming the purchase. However, these offsets do not yet exist, and the successful generation of the agreed number of emission reductions is uncertain.

Unless the contract contains an ex-post adjustment of the purchase price corresponding to any shortfall in offset generation, the customer carries the risk that some or all of the purchase price may be lost, given that offsets might not be delivered. Transparency in such transactions is likely to be limited because providers are unlikely to inform buyers of any shortfall in the number of emissions ultimately achieved. This is especially true for projects that are not expected to deliver the emissions reductions for several decades, as is the case with certain forestry projects. Because buyers must pay upfront with no guarantee of the fulfillment of delivery, such transactions carry the highest risk for the buyer.

Forward crediting is similar to forward purchasing (see above) and the same principles of price-risk hedging and credit risk assessment apply. But there is a substantial difference in risk associated with the two types of transactions: In forward crediting contracts, the purchase price is paid upfront and is not repaid in case of delivery shortfalls. The seller is not obligated to replace delivery shortfalls with offsets from other projects. Because of this, forward crediting might be more suitable for donors who do not depend on exact emissions reductions than for buyers who are looking to offset a precise amount.

6.3.4 How Providers Can Reduce Delivery Risk

Risk management techniques can substantially reduce the risk of project under-performance and consequent delivery failure. One key technique is the portfolio approach: by contracting / developing not just one or a few projects but a large number (e.g. with differing technologies or locations), the provider can diffuse the risk of catastrophic project failure. Restricting sales to the expected delivered volume based on the probability of project failure can significantly reduce the risk of over-selling. Providers with a substantial portfolio of projects are thus able to guarantee the amount, quality, and parameters of the carbon offset delivery to the buyer at contract signature, prior to generation and delivery.

Active risk management can also be applied on a technical and operational level. By hiring technical experts to oversee the job site and perform quality control, and by consulting with local representatives, providers ensure that they will react in a timely manner to technical failure, shortfalls and errors in project documentation, changes in laws and regulations, etc. Although such measures raise project costs for the provider, they also ensure a lower project failure rate.

A third way for the provider to avoid delivery default is to compensate for generation shortfalls with emission reductions purchased from other providers.

Since all forms of risk management require an investment of resources, not all providers are able to offer an optimal delivery guarantee when contracting to generate offsets.

7. Review of Standards Used In the Voluntary Offset Market

7.1 Offset Standard Types

In order to better understand the different standards and their goals we distinguish between the following types of offset standards:

Full-fledged carbon offset standards offer all three components:

1. Accounting Standards
2. Monitoring, Verification and Certification Standards
3. Registration and Enforcement Systems

Project Design Standards (PDS) include accounting standards and some monitoring standards or guidelines, but do not offer certification of offsets or a registry. These PDS are useful for project developers in the initial phase of project development and may help secure upfront funding. But the project developers must use the PDS in conjunction with a full-fledged standard in order to get certification and access to a registry once the project starts producing credits.

Offset Standard Screens are not full-fledged standards by themselves but accept projects that were implemented under other standards and that adhere to their screening standards (e.g an offset screen that accepts all CDM credits, except those from large hydro and industrial gas projects.)

Offset Accounting Protocols provide definitions and procedures to account for GHG reductions from offset projects but have no associated regulatory or administrative bodies. They have programme-specific rules and procedures for reviewing, validating, and registering GHG projects, as well as verifying and certifying GHG reductions. Yet protocols do not define eligibility criteria or have procedural requirements. Many of the full-fledged standards are based on such protocols (for example, the VCS uses ISO-14064 methodologies).

Other Standards Types. Some standards don't quite fit any of the above mentioned categories. These are usually less widely used standards that have been developed for very specific project types. Some of these standards, such as Plan Vivo, sell ex-ante credits. In other words, they sell carbon offsets that are projected to be produced in the future. The standards discussed in this paper fit into the following categories:

TABLE 12: **Offset Standard Types**

Full-Fledged Carbon Offset Standards	Project Design Standards	Offset Standard Screens	Offset Protocols	Other Standard Types
<p>CDM VER+ CCX</p> <p>Once they have established their registries:</p> <p>Gold Standard (GS) Voluntary Carbon Standard (VCS)</p>	<p>Climate, Community & Biodiversity Standards (CCBS)</p>	<p>Voluntary Offset Standard (VOS)</p>	<p>ISO 14064-2 WRI/WBCSD's GHG Project Protocol</p>	<p>Plan Vivo</p>

The following sections describe each standard in more detail. To facilitate cross comparisons, we have followed the same order of topics and the same layout for all standards. The only exceptions to this are the bio-sequestration rules for CDM and VCS, which are discussed in more detail in chapter 7.4 on forestry standards. In these sections, the numbering system is slightly different.

The standards are summarized as objectively as possible. Editorial comments and opinions about the standards can be found in the Authors' Comments at the end of each standard description. Their brief comments focus on what they consider the main strengths and weaknesses of each standard.

7.2 Full-fledged Standards

Full-fledged carbon offset standards offer all three components:

1. Accounting Standards; 2. Monitoring, Verification and Certification Standards and; 3. Registration and Enforcement Systems. In the following sections we describe these full-fledged standards: CDM, Gold Standard, Voluntary Carbon Standard, VER+, and CCX.

CLEAN DEVELOPMENT MECHANISM

<http://cdm.unfccc.int/index.html>

1. Overview

Type of Standard

The Clean Development Mechanism (CDM) is a full-fledged offset standard and is a part of the international legally binding Kyoto Protocol and its related accords. It is administered by the United Nations Framework Convention on Climate Change (UNFCCC). CDM enables industrialized countries to achieve emissions reductions by paying developing countries for certified emission reductions (CERs).

History of Standard

Recognizing the need for stronger action to combat climate change, the parties of the UNFCCC negotiated and adopted the Kyoto Protocol in 1997. At the time of its adoption, the treaty only sketched out the basic features of the GHG trading mechanisms like the CDM. The rulebook detailing how the mechanisms would operate was fleshed out over the next four years, culminating in the Marrakech Accords. The treaty came into force on 16 February 2005, making the trading mechanisms operational.

Administrative Bodies

Conference of Parties serves as the *Meeting of Parties to the Kyoto Protocol (COP/MOP)*: The COP/MOP is the ultimate decision-making body of the UNFCCC. It is comprised of representatives from each member state that has ratified the Kyoto Protocol. The COP/MOP reviews and approves the CDM EB's recommendations, thereby providing guidance and direction to the EB in administering the CDM.

CDM Executive Board (CDM EB) supervises the CDM under the authority and guidance of the COP/MOP,

and is fully accountable to the COP/MOP. The EB has 10 members from parties to the Kyoto Protocol including one representative each from the five UN regions, two each from the list of industrializing countries with emission reduction targets and those without targets, and one from the Small Island Developing States.

The responsibilities of the CDM EB include:

- Developing and amending the rules of procedure for CDM
- Accrediting DOEs
- Registering CDM projects
- Approving new baseline and monitoring methodologies or amendments to existing ones
- Authorizing the issuance of CERs

Accreditation Panel reviews applications from prospective DOEs, reports conclusions and prepares recommendations to the EB for accrediting and designating operational entities.

Methodologies (Meth) Panel reviews proposed new or amendments to existing baseline and monitoring methodologies, and makes recommendations to the EB regarding their approval or amendments. The Meth Panel also makes recommendations to the EB regarding changes to the guidelines for methodologies for baselines and monitoring plans. The Meth Panel is co-chaired by two members of the EB and is composed of an additional 15 members who serve as technical experts on the panel.

Afforestation and Reforestation (A&R) Working Group prepares recommendations to the EB on submitted proposals for new baseline and monitoring methodologies for CDM A&R project activities in cooperation with the Meth Panel.

Small-Scale (SSC) Working Group prepares recommendations to the EB on submitted proposals for new baseline and monitoring methodologies for CDM small scale project activities.

CDM Registration and Issuance Team (RIT) assists the CDM EB by appraising requests for registration of project activities and requests for issuance of CERs. It is chaired by a member of the EB on a rotational basis. The RIT was established in 2006 (before that, in 2004-5, projects were assessed by individual Board members).

Designated National Authorities are agencies designated by each party to the Kyoto Protocol to act as a nodal agency for administering CDM involving parties within its jurisdiction.

Designated Operational Entities (DOEs) are the accredited auditors who validate and verify CDM projects. There are currently 19 registered DOEs, of which 18 are authorized to validate projects and 7 of the 18 are also authorized to verify projects. Only one of 19 is designated solely as a verifier. DOEs are not allowed to do the validation and the verification for the same project, and the sectors that each of them can cover also varies.

Financing of the Standard Organisation

The CDM is financed through the CER issuance fees and through start-up donations from Annex I countries.

Recognition of Other Standards

The CDM does not recognize any other standards. However, many of the regulated and voluntary carbon offset schemes recognize CDM and accept CERs as eligible offsets under their respective schemes. These schemes include the EU ETS, the VOS, VER+, CCX, and the VCS.

Number of Projects

As of September 2007, there are 827 registered projects with a further 154 in the registration process, 2,647 projects in the CDM Pipeline, 46 projects have been rejected and 8 withdrawn. 85,9 million CERs have been issued to date.*

2. Eligibility of Projects

Project Type

CDM accepts projects that reduce the emissions of, avoid the release of or sequester any one of the six gases covered by the Kyoto Protocol with the exception of nuclear energy projects, and sequestration projects other than afforestation and reforestation projects (REDD).

* UNEP RISOE Center <http://www.cdmpipeline.org/>, accessed on 15 November 2007

Project Location

CDM only accepts projects in non-Annex I countries.

Project Size

There are no restrictions on the size of projects.

Projects may be classified as small-scale CDM projects.[†] Small-scale projects use simpler documents and are subject to a simpler approval process than other projects.

Start Date

Originally: 1 January 2000

This rule has lapsed. Currently, the start date is the date of registration.

Crediting Period

The crediting period options for CDM projects are the same for all project types, except afforestation and reforestation projects. In the case of the former, project developers can choose between: (i) a seven-year crediting period with the option of up to two seven-year renewals, , provided the project baseline is still valid or has been updated to take new data into account or (ii) a maximum period of 10 years with no renewal option. For afforestation and reforestation projects, the choice is between: (i) a 20-year period with up to two 20-year renewals or (ii) a maximum of 30 years with no renewal.

CDM Pre-Registration Credits

N/A

Project Funding Restrictions

CDM projects cannot accept any Official Development Assistance (ODA).

Environmental & Social Impacts

While there are no explicit guidelines laid out for the environmental or social impacts of CDM projects, the Kyoto Protocol requires that CDM projects enable developing countries to achieve sustainable development. Each country sets the policies for the sustainable development criteria by which it can assess CDM projects. Social criteria may include improvements in the quality of life, alleviation of poverty, and greater equity, while environmental criteria may include the conservation of local resources, removing pressure on local environments, health benefits, and compliance with domestic environmental policies.

An analysis of the environmental impacts of the project, including trans-boundary impacts, must be provided in the PDD. If an Environmental Impact Assessment (EIA) is required by the host country, the project developer

[†] Projects can qualify as *small scale* if they fulfill the following two criteria:

1. the energy output does not exceed 15 MW,
2. the reduction in energy consumption is less than 15 gigawatt hours per year or the reduction in emissions is less than 15 kilotons of CO₂-equivalent per year.

must also include conclusions of the EIA in the PDD. Similarly, the project developer must also describe the process of inviting comments from local stakeholders likely to be affected by the project, summarize their comments and document the action taken to address their concerns.

The PDD is published for commenting for 30 days on the CDM website.

3. Additionality and Baselines

Additionality Requirements

CDM uses project-specific tools to assess additionality. However, some of the baseline tools are based on performance standards.

The process of determining whether a project is additional involves three or four steps as laid out in the UNFCCC additionality tool version 4 (for details, see Appendix B).

Step 1: Identifying realistic and credible alternatives to the proposed project activity that are compliant with current laws and regulations

Step 2: Investment analysis to determine that the proposed project activity is not the most economically or financially attractive, or step 3

Step 3: Analysis of barriers that prevent the implementation of the proposed project activity or do not prevent the implementation of one of the other alternatives

Step 4: Analysis as to whether the proposed project activity is 'commonly practiced' by assessing the extent of diffusion of the proposed project activity

Baseline & Monitoring Methodologies

CDM follows a bottom-up, project-specific approach to determine baseline and monitoring methodologies. However, once a baseline and monitoring methodology is developed and approved by the CDM EB, the same framework can be used to develop other projects, provided they meet the other eligibility requirements. Existing methodologies have been amended and refined over time as new projects have been proposed and approved with amendments to the previously existing methodologies. Further, similar methodologies for certain types of projects have been consolidated into single methodologies so that they are applicable to a broad range of projects.

Project developers or consultants acting on behalf of the project developers may propose new methodologies. The proposal for a new methodology must be submitted to the UNFCCC secretariat through a DOE. The DOE or a member of the Meth Panel may undertake a pre-assessment of the proposed

methodology. Upon receipt of the complete documentation and a fee of USD 1,000, the secretariat makes the methodology publicly available for comment for a period of 15 days. The Meth Panel reviews and assesses the proposed methodology with the help of the secretariat and based on the independent assessments of four members of the Meth Panel (who are selected on a rotational basis), two independent experts, and comments from the public. Based on the recommendations of the Meth Panel, the CDM EB approves or rejects the proposed methodology. If the proposed methodology is approved or incorporated into a consolidated methodology, then the USD 1,000 fee is adjusted in the registration fees.*

4. Validation & Registration

Process

The project developer or a consultant acting on behalf of the project developer must prepare a Project Design Document (PDD) describing the project activity, the baseline methodology to be used to calculate the emissions reductions under the project and the methodology that will be used to monitor the emission reductions achieved. The PDD is then reviewed by a DOE to confirm the veracity of the information and arguments provided. Simultaneously, the PDD is posted on the DOE's website and opened to public comments for a period of 30 days. The DOE and project developer need to consider the comments received and take action (if deemed necessary) before the DOE finalizes the Validation Report. The DOE review process also involves visits to the project site and consultations with local stakeholders. The DOE's assessment and conclusions, including a summary of the stakeholder consultations, are synthesized into a Validation Report.

The PDD and the Validation Report are submitted to the project host nation's DNA for approval. If the project meets the sustainable development criteria, complies with the country's laws and regulations, and fulfills any other requirement specified by the DNA, the DNA issues a letter confirming the host nation's approval. The PDD, the Validation Report and the Host Nation Approval are then submitted to the CDM EB for registration.

Within 8 weeks (or 4 weeks for small projects) of receipt of the *Request for Registration*, the EB is required to register the project. The RIT supports the EB in this process by reviewing the reports submitted along with the Request for Registration. If a party to the project or at least three members of the EU request a review of the project, then registration can be delayed until the next EB meeting.

* http://cdm.unfccc.int/Reference/Procedures/Pnm_proced_ver12.pdf

Key Requirements

- Completed PDD with the baseline and monitoring methodology
- Validation Report including the stakeholder consultation
- Host Nation Approval

5. Monitoring, Verification & Certification, and Issuance

Process

Once the project is operational, the project implementer or a consultant acting on behalf of the project implementer is required to prepare a Monitoring Report on a periodical basis in accordance with the monitoring protocol in the PDD. The report must also include an estimate of the CERs generated during the reference period. A DOE verifies the Monitoring Report and also carries out a site visit, if deemed necessary. The DOE prepares a Verification Report documenting its assessment of the monitoring report and verifying the emissions reductions. The same DOE that validated a project cannot also verify it except in the case of small-scale projects.

The Monitoring, Verification and Certification Reports are submitted to the CDM EB with a request to issue the requisite amount of CERs. Within 15 days of receipt of this request, the EB must authorize the issuance of the CERs unless a project participant or three EB members request a review. The RIT supports the EB in this process by reviewing the reports submitted along with the Request for Issuance.

Key Requirements

- Monitoring Report estimating the emissions reduction achieved
- Verification and Certification Reports from the DOE confirming the emissions reductions.

6. Evaluation of Auditors

The CDM Accreditation Panel (CDM-AP), which reports to the CDM EB, is required to undertake regular surveillance of the DOE's management responsibilities, resource and organizational management, and technical and analytical review processes, with a view to assessing the DOE's ability to deliver the intended quality of its service. The CDM-AP carries out this surveillance at least every three years with the help of the CDM Assessment Team (CDM-AT).

In addition to the regular surveillance, the CDM EB, with the help of the CDM-AP and the CDM-AT, can conduct an unscheduled assessment of a DOE, a 'spot check' to

ascertain whether the DOE still meets the accreditation requirements.

For both the regular surveillance and the spot checks, the DOE that is being assessed pays for the expenses to be incurred by the CDM-AP and CDM-AT in carrying out the assessment in advance.

7. Registries

The CDM Registry is administered by the UNFCCC secretariat. Upon authorization from the EB to issue CERs for a project activity, the secretariat forwards the issued CERs into a Pending Account until it receives instructions to forward CERs into the relevant Holding Account. Project participants may have a Holding Account either in the CDM Registry or in the National Registry of an Annex I country.*

For CERs to be transferred from an account in the CDM Registry to a National Registry account, they must pass through the International Transaction Log (ITL). The ITL, which is still under development, will record transactions of CERs from the CDM registries to the Annex I National Registries. These transactions include issuance, cancellation, replacement, retirement and the transfer of CERs.† Once the CERs are received in a National Registry account they may be traded or used for complying with national or regional targets. At present, CERs cannot be transferred between National Registries but internal transfers within a National Registry are possible.

8. Fees

New methodology submission fee: USD 1,000 (adjustable in the registration fee if the methodology is approved or consolidated)

Registration fee: USD 0.10 per CER issued for the 15,000 CERs issued in a given calendar year and USD 0.20 per CER for every CER issued over and above the 15,000 CERs. The upper limit set for the fee is USD 350,000. No registration fee is charged if the average annual emissions over the crediting period are less than 15,000 tCO₂e. If the project is not registered, then any amount above USD 30,000 is reimbursed to the project developer.

Issuance fee: 2% of the CERs from each issuance is charged to cover administrative expenses and adaptation costs.

* <http://cdm.unfccc.int/Issuance/IssuanceCERs.html>

† http://regserver.unfccc.int/seors/file_storage/ak11nelszgfgrda.pdf

Authors' Comments on CDM

Quality of EB Decisions

The fraction of projects that are being reviewed and rejected by the CDM Executive Board has increased notably over time. This is especially true since the Registration and Issuance Team (RIT) was established in 2006. Nevertheless, the EB still has a large backlog of CDM projects awaiting registration. Some project developers have expressed dissatisfaction with the fact that project assessment varies quite considerably among RIT members. A major cause for this is the lack of institutional memory and insufficient training of staff. Despite the addition of the RITs, the EB is still not very efficient and is at times quite bureaucratic.

Quality of DOEs

Currently project developers choose and pay DOEs. This causes a conflict of interest which potentially undermines the environmental integrity of CDM projects. As discussed earlier, DOEs are under pressure to do validation and verification services at low prices and in as little time as possible. Also, CDM does not provide detailed instructions on auditing procedures. Despite the DOE review and spot check procedures, there currently does not seem to be a strong threat of sanctions against DOEs that under-perform (Schneider, 2007).

Additionality

The CDM *additionality tool* was developed over several years and is seen as a benchmark against which to compare other additionality testing procedures (it is used by a number of other standards described in this report). Yet recent reports have shown the current additionality tests are to a large extent subjective and can easily be misrepresented (Schneider, 2007; Haya 2007). No approach for determining additionality is perfect. Yet given the importance of ensuring environmental integrity of CDM projects, great care and effort should be put in place to minimize free riders. The CDM Executive Board is in the process of creating a set of validation and verification guidelines. Through creating better definitions for terms such as "common practice" and guidelines for evaluating arguments about project barriers, some non-additional projects could be less likely to be registered

Co-Benefits

There are trade-offs between generating large quantities of offsets and benefits for sustainable development: Project activities with large emission reductions often have few benefits for sustainable development (e.g. industrial gas projects), whereas emissions reductions are often small for projects which have high benefits for sustainable development (e.g. many types of small scale projects). The CDM has so far not been very successful in fostering projects that contribute to sustainable development. This is partly due to the fact that each country can establish their own sustainability criteria. Some host countries may be hesitant to develop stringent sustainability criteria because of the perceived risk of having project developers turn away if their criteria are too stringent. On the other hand, it is also worthwhile pointing out that some co-benefits are indirect such as improvement of infrastructure, additional tax income for the host country, improved power supply and grid stability.

<http://www.cdmgoldstandard.org>

1. Overview

Type of Standard

The Gold Standard (GS) is a full-fledged carbon offset standard. The Gold Standard (GS) requires social and environmental benefits of its carbon offset projects and has a very well developed stakeholder process. The GS can be applied to voluntary offset projects as well as to CDM projects.

History of Standard

The GS was developed under the leadership of the WWF in order to ensure that emission reduction projects are real and provide social, economic and environmental benefits. The GS CDM was launched in 2003 after a two year period of consultation with stakeholders, governments, NGOs and the private sector from over 40 countries. GS VER was launched in 2006. The GS is endorsed by 56 NGOs.

Administrative Bodies

The Gold Standard Foundation is a non-profit organisation under Swiss Law, funded by public and private donors. The operational activities of the GS are managed by the Gold Standard secretariat based in Basel, Switzerland, including capacity building, marketing and communications, certification, registration and issuance as well as maintenance of the GS rules and procedures. The secretariat has currently a staff of 5.

The Foundation Board oversees the strategic and organizational development of the Gold Standard. The Board has currently 8 members. At least 50% of its members must be recruited from the Gold Standard NGO supporter community, and one member is at the same time the Chair of the Gold Standard Technical Advisory Committee (GS-TAC, see below). In case of significant changes to the Gold Standard rules and procedures, the Board decides whether or not a Gold Standard NGO supporter majority is necessary to implement the change.

Technical Advisory Committee (GS-TAC) evaluates and approves projects, new methodologies for VER projects and is in charge of updating the GS rules and procedures. It is the equivalent of the CDM EB / Meth Panel for VER projects. The GS-TAC has currently 7 members, all acting in their personal capacities. The GS-TAC members are from the NGO community, multilateral organizations, aid agencies and the private sector.

Gold Standard NGO Supporters decide on major rule changes (e.g. eligibility of project types). Gold Standard

Supporter NGOs must be consulted as part of the Gold Standard stakeholder consultation in case they have operations in the relevant host country. Supporter NGOs are also invited to take part in the project reviewing process and can request an in-depth audit of GS projects both at the registration as well as issuance stage.

GS Auditors are UNFCCC accredited DOEs who carry out validation and verification of GS projects. DOEs are not allowed to do the validation and the verification for the same project, except for micro and small scale projects.

Financing of the Standard Organisation

The standard is financed through donors and income from issuance fees and franchising fees.

Recognition of Other Standards

The GS does not recognize any other voluntary standards. Yet the GS it is recognized by the VOS and is likely to be recognized in the near future by several other standards (VER+, VCS.)

Number of Projects

In total, 10 projects have been registered under the Gold Standard. About 35 projects are official Gold Standard Applicants, representing about 4 million CERs and 500,000 VERs. Another 65+ projects are in the pipeline.

2. Eligibility of Projects

Project Type

The GS accepts renewable energy (including methane-to-energy projects) and energy efficiency projects. It excludes large hydro projects above 15 MW capacity.

Project Location

Gold Standard VER projects cannot be implemented in countries with an emissions cap, except if Gold Standard VERs are backed by AAUs being permanently retired.

Project Size

The Gold Standard does not have any project size minimum. Project sizes for Gold Standard VERs are: micro-scale (<5,000 tonnes CO₂ per year), small-scale (5,000-60,000 tonnes CO₂ per year) or large-scale (>60,000 tonnes CO₂ per year).

For Gold Standard CERs, the same size limits as for the CDM apply.

Start Date

The earliest start date for retroactive crediting of Gold Standard VERs is January 1st 2006, and retroactive crediting is only permitted for a maximum of 2 years prior to the registration date.

Retroactive crediting for CDM projects submitting documentation (Gold Standard Validation report) is limited to two years prior to the date of registration for the Gold Standard. For years with compliant verification reports that lie only partly within that period, a proportional volume of credits is issued.

Crediting Period

Crediting periods are either one 10 years period, or a 7 year period renewable three times, except for validated pre-CDM Gold Standard VERs (see below).

Projects can opt-in for Gold Standard crediting during the overall crediting period by submitting a Gold Standard-compliance verification report to the Gold Standard. Projects can opt-out of Gold Standard crediting during the overall crediting period, but opt-out is final and the project cannot be communicated as Gold Standard any more.

Prior to opt-in and after opt-out it is permissible to seek issuance of credits from other standards. It is however not permitted to apply for issuance of credits under different standards if this extends the overall crediting period of the project beyond what is possible under the Gold Standard VER rules.

CDM Pre-registration Credits

The Gold Standard does certify CDM pre-registration credits for a maximum of a year prior to the project's CDM registration date under certain conditions:

- The project developer can provide proof that the final version of the PDD has been submitted for validation to the DOE prior to 31st of January 2008.
- The DOE must provide a verification report covering the Gold Standard VER period either with the first verification of Gold Standard CERs or separately.
- The reasons for the delay between the start of project operation and CDM registration have to be explained by the DOE as part of the verification report covering the Gold Standard VER period.

Gold Standard VERs will only be issued after the project has been successfully registered as a Gold Standard CDM project. Once the project has been registered as a Gold Standard CDM project the normal Gold Standard rules apply.

Project Funding Restrictions

Official Development Assistance (ODA) funding is not allowed for Gold Standard CER projects, except from the development of the PDD or of a new methodology,

but is acceptable for Gold Standard VER projects if additionality of the project can be clearly established.

Environmental & Social Impacts

Both Gold Standard CER and Gold Standard VER projects must show clear sustainable development benefits, including local and global environmental, social, and economic as well as technological sustainability. The GS provides a sustainability matrix to help project developers develop their sustainability criteria. The GS requires that critical and sensitive sustainable development indicators and mitigation or compensation measures are monitored over the entire crediting period and information on the status of the indicators is included in the verification reports.

Both the project developer and the stakeholders consulted assign scores between -2 (major impact that cannot be mitigated) and +2 (major positive impact) to a broad set of pre-defined indicators covering all aspects of sustainable development. Scoring depends on specific circumstances, and the framework chosen for the scoring process is tailored to each project and must be clearly explained and justified.

Environmental Impact Assessment (EIA) requirements are the same for both VER and CER stream for small- and large-scale projects. For micro-scale voluntary offset projects, an EIA is required if the relevant local or national law prescribes an EIA or potentially if stakeholders have concerns about environmental impacts for which mitigation measures cannot be identified – in such a case, the project must be treated as a small- or large-scale project. If no EIA is required by the legislation, the project developer still has to provide a statement confirming that the project complies with local environmental regulation.

Gold Standard requires two public consultation rounds for all projects (except micro-scale projects, which require one initial consultation only). VER offset projects require a letter to the Designated National Authority (DNA or, if not present, other relevant authority) to communicate the development of the project as a GS voluntary offset project. For micro-scale projects, only one consultation round is needed during the design phase.

During a 60-day period prior to finalizing the validation process, stakeholders must have the opportunity to make comments on the GS-PDDs. For VER projects, no international stakeholder consultation is required, in contrast to CDM projects. National Gold Standard NGO supporters and international GS NGO supporters with offices in the host country must be involved in stakeholder consultations in all cases.

3. Additionality

Additionality Requirements

The additionality tools for both GS CERs and VERs are project based. In addition, previous announcement checks are required for both CER and VER projects.

The GS requires the application of the latest UNFCCC additionality tool (see Appendix B).

Baselines & Methodologies

GS CDM projects can only use CDM EB approved methodologies. Gold Standard VER projects can choose to use the baseline methodologies approved by the Methodology Panel of the CDM Executive Board, the Small Scale Working Group (SSC WG) or the United Nations Development Programme (UNDP) MDG Carbon Facility. If no suitable methodology exists, Gold Standard VER projects can propose a new one to Gold Standard, to be approved by the Gold Standard Technical Advisory Committee at a fixed cost paid by the project developer. The fees are USD 2,500 for small & large projects and USD 1,000 for micro-scale projects. A methodology for the deployment of a fleet of small-scale biodigesters has been approved so far and others are under review.

4. Validation & Registration

Process

In general, the requirements for Gold Standard VER and Gold Standard CER projects are identical, but for VERs, some requirements of the CDM have been simplified or removed:

- Simplified guidelines for micro-scale projects (< 5000 t of emission reductions annually)
- Broader eligibility of host countries
- Lower requirements on the use of official development assistance (ODA)
- Broader scope of eligible baseline methodologies
- No need for formal host country approval

All Gold Standard projects must be validated and verified by a DOE. The Gold Standard supports DOEs with a validation manual for each VER and CDM stream.

Micro Projects

Validation and verification procedures are often unreasonably costly for micro-scale projects. Hence, micro-scale projects pay a standard fee to a validation fund (USD 5,000) and to a verification fund (USD 2,500). After submitting all documentation, Gold Standard TAC uses a 'targeted random' selection method to select projects for validation and verification. Actual validations and verifications performed by DOEs are paid for via the Gold Standard validation and verification funds. Projects not selected for DOE validation/

verification in this approach are validated/verified by the Gold Standard in-house but may be required to undergo DOE verification in later years.

Key Requirements

- Stakeholder consultation report
- Completed PDD with the baseline and monitoring methodology, and the sustainable development matrix
- Validation Report
- Acceptance of the Gold Standard Terms and Conditions.

GS CDM projects use CDM PDD and validation forms, with the additional Gold Standard specific information on project type, stakeholder consultation and contribution to sustainable development provided as an appendix. The GS provides templates and instructions for GS VER project verification documents.

5. Monitoring, Verification & Certification

Process

Project developers monitor projects according to monitoring plans as given in the PDD. Monitoring reports are submitted to a third-party auditor (DOE). Gold Standard-specific verification is conducted by DOEs. It includes emission reduction data and monitoring of sustainable development indicators. Monitoring reports have to be submitted yearly. Normally, the same DOE cannot validate and verify the same project, except for micro-scale and small-scale projects.

The Technical Advisory Committee, the GS secretariat and GS NGO supporters can request clarifications or corrective actions within a 2-week period after submission of the verification report to the GS before credit issuance (GS VERs) or certification of CERs is initiated.

Until the Gold Standard VER Registry has been approved, GS VERs are issued with unique provisional serial numbers. Currently, VERs are issued directly by the Gold Standard.

Key Requirements

The verification report showing compliance with GS reporting criteria (especially Sustainable Development Indicators.) Indicators must be monitored if:

- they are crucial for the overall positive impact on sustainable development
- they are particularly sensitive to changes
- stakeholder concerns have been raised.

Appropriate success indicators for mitigation or compensation measures must also be monitored.

6. Evaluation of Auditors

The GS only accredits DOEs and relies on the quality control procedures of the UNFCCC (e.g. CDM spot check procedure).

7. Registries

The Gold Standard Foundation announced in November 2007 that APX, Inc. has been selected to create and manage the Gold Standard's Registry for Verified Emissions Reductions (VERs) in the voluntary carbon market. CERs are registered in the CDM registry and will be tracked in the Gold Standard registry as well. VERs will be registered in the Gold Standard registry which will be launched in early 2008.

The Gold Standard does not engage in project or credit transactions. In the upcoming Gold Standard VER registry, it will be possible to track the number of retired Gold Standard VERs and to review the number of issued Gold Standard VERs. However, buyers and intermediaries between the point of issuance and the point of retirement remain unknown to the Gold

Standard. The ownership of retired credits can be made public if desired.

8. Fees

The Gold Standard charges an issuance fee of currently 0.01 USD for CERs and 0.10 USD for VERs. No registration fee is charged. Separate fees are charged by the Gold Standard VER registry operators: 0.05 USD at issuance and 250 USD per year for all accounts except project owners. The 250 USD include trading transactions for 25,000 credits p.a., after which every trade is charged with 0.01 USD/credit. No fees are charged to transfer the credits out of the project owner account.

Already operational projects can earn retroactive Gold Standard status. For this, they need to go through a feasibility pre-assessment process for which the Gold Standard charges a fee of USD 0.01 per VER for an amount of VERs equivalent to the expected annual volume of reductions (with a minimum fee of 250 USD).

If the project developer submits a new baseline methodology, the methodology must be approved by the Gold Standard TAC. A fixed fee is charged for this process (1,000 USD for micro-scale and 2,500 USD for small and large-scale projects).

Authors' Comments on the Gold Standard

The Gold Standard is generally accepted as the standard with the most stringent quality criteria. Many buyers turn to Gold Standard as the only full-fledged standard endorsed by leading environmental NGOs. It is furthermore the only voluntary standard that has the following three elements: clearly defined additionality rules, required third-party auditing and an approval body similar to the CDM EB.

Co-Benefits

The supplemental criteria of the GS are all validated by a DOE. According to project developers, this often makes the validation process more intensive. In their experience, DOEs take this additional GS validation seriously and ask tough questions about the project's background data for filling in the Gold Standard SD matrix.

The CDM has a rather poorly defined process for how to involve stakeholders. The GS improves this process by having clear and detailed definitions of the stakeholder consultation process. However, the projects eligible for GS generally do not face serious concerns from stakeholders. It would actually be much more important to improve stakeholder consultation of other CDM projects, for example, large hydro projects.

Additionality

Similar to the stakeholder process mentioned above, the UN regulations on additionality for small-scale projects are not very well defined. The GS addresses this issue by requiring that the additionality tool is also applied to small-scale projects.

Complex Documentation

The Gold Standard sets demanding requirements and documentation thereof. This makes the validation and verification process more complicated, time-consuming and expensive. Some project developers might decide that the higher income from Gold Standard CERs (over regular CERs) does not justify the extra work.

Limitation of Project Categories

Gold Standard only recognizes offset reductions from renewable energy and energy efficiency projects. This is potentially limiting, since the energy sectors are the most likely to be covered by mandatory reduction targets. If the United States, for example, were to implement a cap-and-trade programme covering the electricity generation sector, offsets from these types of projects would no longer be possible. Also, given the large contribution of deforestation to climate change, it would seem important to add bio-sequestration projects, especially since the Gold Standard, with its focus on high quality offsets with co-benefits could play an important role in ensuring quality in this sector.

Future of Gold Standard

Currently, the Gold Standard is in the process of improving its rules and procedures. Gold Standard version 2 is expected to go live in May 2008 and will provide further clarification and guidance for project types, additionality, sustainable development assessment, stakeholder consultation, and for the validation and verification process. It remains to be seen if the GS, currently a very small organisation, will be able to certify large quantities of emission reductions.

At the moment, with only a few projects using Gold Standard, it is a challenge to balance strengthening the standards with the need to attract project developers, most of whom are currently not willing to invest in much additional work to ensure environmental integrity and co-benefits.

It seems likely that the Gold Standard will only be successful on a larger scale if it succeeds in creating enough incentives to motivate more project developers to follow the strict guidelines. This could possibly be accomplished through creating a large and sustained demand for Gold Standard offsets and through streamlining the Gold Standard process as much as possible without compromising the integrity of the standard.

VOLUNTARY CARBON STANDARD 2007 (VCS 2007)

<http://www.v-c-s.org>

1. Overview

Type of Standard

The Voluntary Carbon Standard is a full-fledged carbon offset standard. It focuses on GHG reduction attributes only and does not require projects to have additional environmental or social benefits. The VCS 2007 is broadly supported by the carbon offset industry (project developers, large offset buyers, verifiers, projects consultants). VCS approved carbon offsets are registered and traded as Voluntary Carbon Units (VCUs) and represent emissions reductions of 1 metric tonne of CO₂.

History of Standard

The Voluntary Carbon Standard (VCS) version 1 was published jointly in March 2006 by *The Climate Group* (TCG), the *International Emissions Trading Association* (

IETA) and the *World Economic Forum Global Greenhouse Register* (WEF). The VCS 2007 was launched in November 2007 following a 19-member Steering Committee review of comments received on earlier draft versions. The Steering Committee was made up of members from NGOs, DOEs, industry associations, project developers and large offset buyers. The *World Business Council for Sustainable Development* joined in 2007 as a founding partner of the VCS 2007. The VCS will be updated yearly for the first two years and every two years after that.

Administrative Bodies

VCS Association manages the VCS. The VCS Association is an independent, non-profit association registered under Swiss law that represents the VCS Secretariat and the VCS Board.

VCS Secretariat is responsible for responding to stakeholder queries, managing relationships with

registry operators and accreditation bodies, and managing the VCS website and projects database.

VCS Board is responsible for approving any substantial changes to the VCS 2007. It also evaluates and approves other GHG Standards (whether in full or elements of them) project methodologies and additionality performance standards. It also has the authority to suspend an approved programme temporarily or indefinitely if changes are made to it that affect its compatibility with the VCS Programme. Further, it can sanction validators and verifiers, project proponents and registry operators for improper procedure. Finally, it decides on appeals made by project developers against a validator or verifier.

Technical Advisory Groups (TAGs) support the Board by providing detailed technical recommendations on issues related to the programme and its requirements (e.g. the Agriculture, Forestry and Other Land Use TAG for bio-sequestration projects).

Accredited Third-Party Auditors have the authority to validate and verify GHG emission reduction projects, validate new baseline and monitoring methodologies, validate additionality performance standards, and perform gap analyses of other GHG programs. They can only do so for project scopes and geographies for which they are accredited. To receive accreditation, they must either be accredited under an approved GHG Programme or under the ISO 14065:2007 with an accreditation scope specifically for the VCS Programme. Unlike under CDM, accredited third-party auditors can validate and verify the same project.

Financing of the Standard Organisation

Start-up funding for the VCS Standard Organisation comes from TCG, IETA and WBCSD with additional fundraising currently underway. Donations from commercial organisations are capped at €20,000 per annum. In the medium term costs will be covered by a per-tonne levy charged at the point of VCU issuance.

Recognition of Other Standards

At present, the VCS Programme recognizes the CDM and JI, and is in the processing of evaluating the California Climate Action Registry. VCS will evaluate and adopt other offset standards either fully or elements of them. The approval process will be based on the principle of full compatibility with the VCS Programme. If another offset standard is fully adopted by the VCS, all their auditors and methodologies are automatically accepted by the VCS. All credits certified by that standard will then be fungible with VCS credits, the Voluntary Carbon Unit (VCU).

Number of Projects

VCS 2007 was launched in November of 2007. It is not possible to determine how many projects have been certified under VCS 2007 to date because the VCS

registries and central project database are still under development. Several projects were validated and verified against VCS version 1. The VCS Association expects that between 50–150 projects creating between 10–20 million tonnes of CO₂e will have been approved under the VCS Programme by the end of 2008.

2. Eligibility of Projects

Project Type

All project types are allowed under the VCS Programme provided they are supported by an approved VCS methodology or if they are a part of an approved GHG programme. Exceptions are: projects that are “reasonably assumed” to have generated GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction (e.g. new HCFC facilities) and projects that have created another form of environmental credit (e.g. Renewable Energy Certificate). RECs are fungible with VCUs if the GHG Programme certifying the RECs has been approved under the VCS. In addition, projects that have created another form of environmental credit must provide a letter from the programme operator that the credit has not been used under the relevant programme and has now been cancelled (so it can not be used in the future).

Project Location

No restrictions. Retirement of corresponding AAUs required for projects in Annex-1 countries.

Project Size

There is no upper or lower limit on project size. VCS does however classify projects into 3 categories based on their size:

- Micro projects: under 5,000 tCO₂e per year
- Projects: 5,000–1,000,000 tCO₂e per year
- Mega projects: greater than 1,000,000 tCO₂e per year

The rules on validation and verification vary to some degree for projects that fall in the ‘micro’ or ‘mega’ categories.

Start Date

The earliest project start date permissible under the VCS is 1 January 2002. For the 1st year of the VCS 2007's operation, projects that started anytime after January 1st 2002 will be accepted provided they complete the validation process within a year from 19 November 2007. After the first year, only those projects that started within 2 years before the validation date will be accepted. In other words, retroactive crediting is allowed for up to two years from the validation date.

Crediting Period

The earliest permissible start date for the crediting period is 28 March 2006. The duration of the crediting period can be a maximum of 10 years and it can be renewed up to three times.

CDM Pre-registration Credits

CDM pre-registration credits are allowed in accordance with the start date and crediting period rules above. No further additionality proof required.

Project Funding Restrictions

The VCS imposes no exclusion of ODA funds.

Environmental & Social Impacts

The VCS does not focus on environmental and social benefits. It is sufficient for VCS projects to show that they are compliant with local and national environmental laws.

The requirements for stakeholder involvement are based on ISO 14064-2 requirements and are stated in general terms: Independent stakeholders are provided with access to all documents that are not commercially sensitive and given sufficient opportunity to offer comments and other inputs.

3. Additionality and Baselines

Additionality Requirements

The VCS uses project-based, performance-based and positive technology list-based additionality tests. The **project-based test** closely follows CDM procedures:

Step 1: Regulatory surplus: The project must not be mandated by any enforced law, statute or other regulatory framework. This criterion also applies to projects using the performance or positive list tests.

Step 2: Implementation barrier: The project must demonstrate that it faces capital or investment return constraints or an institutional barrier that can be overcome by additional revenues from VCU sales, or that it faces technology-related barriers to implementation of the project.

Step 3: Common practice: The project must demonstrate that it is not common practice in the sector or region when compared with other projects that received no carbon finance, and if it is found to be common practice, then the project proponent must identify barriers it faces that were not faced by the other projects. In demonstrating this criteria, the VCS advocates the use of guidance provided by the GHG Project Protocol for Project Accounting (see GHG Protocol).

A **performance test** can be used as an alternative to the project-based additionality test. With a performance test, a project can demonstrate that it is not business as usual if the emissions generated per unit of output it generates are below a benchmark level approved by the VCS Programme for the product, service, sector or industry. At the time of its launch, no performance standards had been approved. New performance tests will be approved through the double approval process and by the VCS Board.

A **positive list of approved technologies** can be used as an alternative to the project-based additionality test. The project developer still has to use a baseline methodology to determine the number of offsets a project will create. At the time of its launch, no technology was included in the positive list. The list is currently under development.

Baselines & Methodologies

The VCS accepts projects using existing methodologies either approved under the VCS Programme or another approved GHG Programme, and also approves new ones. At the time of the VCS 2007 launch, all CDM baselines and monitoring methodologies had been approved for use under VCS and methodologies from the California Climate Action Registry were under consideration.

For the most part, VCS draws on guidelines provided in ISO 14064-2:2006 to guide the development of a VCS Programme Methodology (see section on ISO 14064). The VCS Board will approve new methodologies using a double approval process which entails seeking an approval from two independent accredited auditors, one appointed by the project developer and the other appointed by the VCS Secretariat. The Board automatically approves the standard if there is unanimity amongst the two auditors and rejects it if there is a disagreement between them. The project developer can appeal the decision. If it does so, then the VCS Secretariat appoints an independent consultant to review the project proponent's claim. Based on the review, the VCS Board then makes a final decision. The expenses for each review are borne by the project proponent.

4. Validation & Registration

Process

Under the VCS, validation is required but can be done at the same time as verification. The VCS provides a template for both the validation and the verification report.

Projects may choose to be validated either as an individual project or as part of a grouped project including two or more subgroups each retaining their distinctive characteristics. Group projects are only sampled by the project auditor.

A project proponent contracts an accredited auditor of the VCS Programme or of a VCS-approved GHG Programme to validate the project. The auditor evaluates the project against the VCS' validation requirements (see below) and prepares its report as per the VCS Validation Report template.

The project is automatically approved if it is successfully validated by the auditor. A formal registration process with the VCS Association takes place only at the time of issuance of VCUs. However, upon successful validation, a VCS project may volunteer to be recorded on the VCS Project Database. In order to do so, its documents are checked for authenticity by the registry operator and the verifier completes a GPS search on the project database that checks if the project has been registered under the VCS before.

Key Requirements

The validation of a project is to be carried out in conformance with the requirements of ISO 14064-3:2006 and the report prepared as per the VCS Validation Report template including:

- Project Design
- Baseline
- Monitoring Plan
- Calculation of GHG Emissions
- Environmental Impact
- Comments by Stakeholders

5. Monitoring, Verification & Certification

Process

The emission reductions achieved by VCS projects can be verified by the same entity that validated the project. The VCS Board does not approve or reject projects; it is the auditors themselves who verify the projects and approve the claimed emissions reductions.

The third-party auditor verifies the emissions reductions and the accuracy of emission reduction calculations as per the requirements of ISO 14064-3:2006. After a project has been validated and verified, the VCS Project Document and proof of title are submitted to the registry operator. Electronic copies of these documents are then put on the VCS project database and are publicly available.

Key Requirements

Verification report prepared as per the VCS Validation Report template.

6. Evaluation of Auditors

One year after the launch of the VCS 2007, the VCS will conduct an external review of all the projects that will have been certified. This work will likely be carried out by a commissioned NGO. VCS will then evaluate the results and decide if any of the rules have to be modified to improve the standard or close any unforeseen loopholes.

There is currently no plan to have a systematic evaluation of the third-party auditors. Yet the VCS board has the authority to sanction auditors, project developers or registry operators "based on evidence of an improper behavior." (VCS Programme Guidelines, p.7).

7. Registries

The VCS will accredit different registries. To avoid double counting and to ensure that VCUs are only registered in a single registry, the VCS will also maintain a project database on its website which will assign a serial number to each project. The database will be publicly available and enable anyone to look up the vintage of the offsets, the project proponent, the registry in which they are kept, and other project information.

To minimize the risks of double counting, the project owner must further submit the following to the VCS:

- a) A letter confirming that the VCUs being registered have not been registered, transferred or retired prior to the said registration;
- b) Where emissions reductions have occurred in an Annex-1 country, a certificate from the national registry of the host country stating that an equal number of Assigned Amount Units have been cancelled from that registry;
- c) Proof that emission reductions (from renewable energy projects) have not arisen from an activity used to meet a regulatory renewable energy commitment or to generate Renewable Energy Certificates or that the latter have been cancelled.

8. Fees

The registration fee for each VCU issued is 0.04 Euros (November 2007). Account fees will be set by each of the VCS approved registries.

Authors' Comments on the VCS

The VCS is a base-level-quality standard that aims to keep costs for validation and verification low while still ensuring basic quality requirements. The VCS has outsourced a number of tasks that under CDM are done by the Executive Board and the Methodology Panel (e.g. project and methodology approval). The advantage of this is that the organisation can be kept very lean. Also, outsourcing tasks to professionals in the respective fields can potentially increase the quality of work (e.g. having a proposed methodology evaluated by an external advisory group of experts in that particular technology). The downside of this approach is that more decision making power is given to outside entities.

No Separation of Verification and Approval of Projects

Under the VCS, it is the auditors themselves who approve the projects. Given the pressures on auditors and given the conflict of interest discussed earlier, we see the lack of an accrediting board to review projects and give final project approval as a potential weakness of the VCS. A double approval process for projects similar to the one VCS uses for methodology approval could be a potential solution to this.

Approval of Methodologies

There is pressure on auditors to approve their clients' methodologies in order to maintain a good relationship and not compromise future work opportunities. As has been shown in the CDM (Schneider, 2007), this design flaw in carbon markets is difficult to address as long as the project developer pays for and can choose the auditor. VCS is mitigating the fact that project developers and auditors have aligned interests by having two auditors approve a new methodology (the second of which is chosen by the VCS and reports directly to the board). It will be interesting to see how well this system works in practice.

Additionality

The VCS plans to add benchmark tools and technology lists to its additionality tests. Since these tools have not been developed yet, we cannot comment on their quality or stringency. However, the VCS 2007 states that benchmark and technology list tools must demonstrate that projects approved under them would also be approved under the project-based tests. Nevertheless, current VCS documents do not indicate that these tools will have embedded measures to account for free riders, for example through discounting of offsets that are accredited through benchmark tools. We hope that a conservative approach will be taken to ensure the integrity of these additionality tools.

Crediting Period

The VCS crediting period for offset projects is 10 years with the option to renew three times. This is considerably longer than under the CDM or the Gold Standard (3 times 7 years). Extending the crediting period means that fewer emissions reduction projects are necessary to create the same number of emissions reductions. In other words, there is a trade-off between limiting crediting periods to the minimum to allow more projects to enter the market and extending it to the maximum to make more projects viable. Longer crediting periods will result in fewer projects being implemented. Also, having longer crediting periods than other standards might allow project developers to jump to the VCS once the crediting period of the originally chosen standard has expired. This raises potential additionality issues.

* Commercially sensitive information is defined as:
Trade secrets, financial, commercial, scientific, technical or other information whose disclosure could reasonably be expected to result in a material financial loss or gain, prejudice the outcome of contractual or other negotiations or otherwise damage or enrich the person or entity to which the information relates. (VCS 2007, p.6)

Co-Benefits

The VCS requirements for stakeholder involvement are based on ISO 14064-2, which states these only in very general terms. Definitions of stakeholders, confidential information* and 'sufficient opportunity' for comments appear to be left to the project developer to decide. There are also no specified procedures and rules on how stakeholder concerns are to be taken into consideration. For buyers who place value on these co-benefits, VCS would not be a sufficient standard.

Future of VCS

Given that the VCS 2007 is broadly supported by the carbon offset industry, it will likely become one of the more important standards in the voluntary offset market and might very well establish itself as the main standard for voluntary offsets. The VCS version 1 was criticized by many as too weak and vague. The VCS 2007 was developed after a 2-year stakeholder consultation and has taken into account many of these criticisms and is clearly an improvement over version 1.

Since VCS 2007 was just released, it is too early to judge if the standard will be able to realize its goal of ensuring "that carbon offsets that businesses and consumers buy can be trusted and have real environmental benefits." We are hoping that the VCS will use its market position to improve the quality of offsets and will address some of the potential weaknesses in the standard.

VER+

www.tuev-sued.de/climatechange

www.netinform.de

1. Overview

Type of Standard

The VER+ is a full-fledged carbon offset standard and closely follows the Kyoto Protocol's project-based mechanisms (CDM and JI). It does not focus on co-benefits.

History of Standard

The VER+ standard was developed by TÜV SÜD, a Designated Operational Entity (DOE) for the validation and verification of CDM projects. It was designed for project developers who have projects that cannot be implemented under CDM yet who want to use very similar procedures as the CDM. The VER+ was launched in mid 2007.

Administrative Bodies

TÜV SÜD certification body "climate and energy" has four members who supervise and administer the VER+ standard's criteria. The same body also reviews all the CDM projects that TÜV SÜD audits as a DOE before the documents are submitted to the CDM EB.

Third Party Auditors are CDM and JI accredited auditors. They are approved to validate and verify projects. In the validation and verification process, the auditing company is obliged to follow the requirements as defined by the Validation and Verification Manual (initially published by Worldbank / IETA), in its most

recent version. Unlike under CDM, accredited third-party auditors can validate and verify the same project.

Financing of the Standard Organisation

The VER+ is financed by funds from TÜV SÜD and by issuance fees for use of the registry.

Recognition of Other Standards

If a project that has been initially implemented under another standard seeks VER+ certification, a so called "equivalence check" is carried out. Based on validation and verification reports, the auditor in charge confirms that the already audited project also complies with VER+ requirements.

Number of Projects

At the end of 2007 there were approximately 25 validated projects and several verifications were taking place. The demand for VER+ is growing, especially among project developers in China and for CDM pre-registration credits.

2. Eligibility of Projects

Project Type

VER+ accepts all project types except HFC projects, nuclear energy projects, large and hydropower projects over 80MW. Hydro projects exceeding 20MW have to conform with World Commission on Dams rules. LULUCF projects, including REDD, are accepted if implemented

with a buffer approach to address the risk of potential non-permanence.

Project Location

VER+ follows the same project criteria as JI but without limitation to the status of the host country. Hence, the host country can be an Annex I, non-Annex I or non-ratification country.

VER+ credits generated in an Annex I country need to demonstrate the retirement of AAUs in order to be fully interchangeable with VER+ credits from a non-Annex 1 country. Furthermore VER+ credits can be issued if it is demonstrated that the host nation does not participate in International Emissions Trading (Kyoto Protocol Art 17) or if it is confirmed that VER+ credits will not be transferred out of the host country.

Project Size

No restrictions apply.

Start Date

Applications for retroactive VER+ accreditation can be submitted for start dates as early as January 1st, 2000. Retroactive crediting has been limited such that credits are issued for 2 years back from the registration date (at the certification body of the auditor in charge) and will be phased out by the end of 2009.

Crediting Period

The crediting period of VER+ activities ends at the end of the latest agreed commitment period under the UNFCCC scheme. At the end of 2012 a brief check up on the “Kyoto status” of the host country will be carried out to avoid double counting with UNFCCC regimes. Once this review is carried out, the crediting period is extended up to the end of the next commitment period (as defined by UNFCCC). At the end of this next commitment period (e.g. 2020), a revalidation is required. The maximum crediting periods are limited to 25 years for standard projects and 50 years for LULUCF activities.

CDM Pre-Registration Credits

The generation of VER+ credits is possible ahead of the registration of a CDM project without any further additionality testing. A registered CDM project has to have started to operate and reduced emissions prior to UNFCCC registration. The earliest starting date for this pre-CDM/JI crediting is the date of publication of the PDD on the UNFCCC website (Global Stakeholder Process). VER+ crediting may occur until CDM/JI registration. No separate PDD is needed for CDM or JI activities applying for VER+ credits for a crediting period prior to the one under UNFCCC.

Project Funding Source

As under CDM rules, VER+ projects are not allowed to use Official Development Assistance (ODA).

Environmental & Social Impacts

If the project activity requires an Environmental Impact Assessment (EIA) due to national legislation, it needs to be submitted for project approval.

If required by national law, a local stakeholder process has to be carried out. Otherwise, the project developer can choose between:

- performing a voluntary stakeholder process and include documentation to the VER+ Project Design Document (PDD), or
- justifying in the VER+ PDD that the project does not impact the vicinity.

Just like in CDM the PDD is published for 30 days on the DOE's website and comments can be made via the website, which will then be considered in the audit process.

(www.netinform.de; look for climate and energy).

3. Additionality and Baselines

Additionality Requirements

Additionality tests for VER+ are project-based.

Baselines & Methodologies

All CDM approved baselines and methodologies are allowed. The latest versions of the CDM methodologies have to be used. If there is no existing CDM methodology that matches the project conditions, a project specific methodology can be developed. This new methodology is reviewed on a project by project basis. The project methodology has to be based on “guidance on criteria for baseline setting and monitoring” as defined for JI activities.

Additionality Criteria

VER+ projects are required to:

- follow specific additionality rules of an approved CDM methodology or
- in all other cases, apply the most recent version of the CDM Additionality Tool.

4. Validation & Registration Process

Process

A UNFCCC-accredited auditor reviews the validation process and approves the project. The project is then registered with the auditor in charge. The results of the validation (as well as verification at a later stage) are forwarded to the BlueRegistry, where relevant information of VER+ projects is held and publicly available.

Key Requirements

The requirements are similar to those of CDM but they do not require approval from the host country:

1. Completed PDD
2. Validation Report

A project specific approach as defined for JI can be used for those project settings where a CDM approved methodology is not available or fully applicable.

5. Monitoring, Verification & Certification

Process

Verification is based on monitoring reports from the project developers and conducted by an auditor. The auditor also approves the verification report. All VER+ project documentation is submitted to the BlueRegistry. Unlike under CDM rules, an auditor is allowed to do validation and verification of the same project.

The first verification is required at latest one year after registration of the starting date of the crediting period. For LULUCF projects, a first verification is required within 5 years from validation.

For any VER+ activity, the frequency of the proceeding verifications can be chosen by the project participants. Based on a positive verification statement, VER+ credits are issued by the auditor.

Key Requirements

1. Monitoring Report
2. Verification Report

6. Evaluation of Auditors

Since the VER+ relies exclusively on DOEs, the standard relies on the review procedures of the CDM.

7. Registries

In June 2007, TÜV SÜD launched its own BlueRegistry for VER+ credits. An account is opened for each verified VER+ project at TÜV SÜD's BlueRegistry. In an effort to prevent project developers from registering their credits with multiple registries, VER+ includes in its contract a clause that stipulates that the credit holder shall refrain from double selling / registering. The BlueRegistry intends to accept GS-VER and VCS certified credits and already registers green energy certificates. Agreements on the standardized interchange between registries are currently pending.

8. Fees

Total costs for validation, registration and VER+ issuance charged by the auditing company vary depending on project size, technology, location etc. and is estimated to be in the range of 5,000 to 15,000 Euros.

If verification has been carried out by TÜV SÜD then all VER+ credits are automatically registered in the BlueRegistry without additional costs.

For projects and credits not verified by TÜV SÜD, there is a registration fee which covers incorporation into the BlueRegistry. TÜV SÜD charges a one time subscription fee (550-1100 Euros) and a registration fee (1500-3000 Euros p.a.) for opening and maintaining accounts. In addition the transaction fee for registered credits ranges from 120 Euros for 200 tonnes or less to 700 Euros for 10,000 tonnes or more.

Authors' Comments on the VER+

No Separation of Verification and Approval of Projects

TÜV SÜD has a good reputation as a DOE and is a well-know auditor. We are nevertheless concerned about potential conflicts of interest. Currently, most VER+ projects are validated and verified in house, since both the certification body and the auditor are in this case TÜV SÜD, it is difficult to know if project approval will always be strictly independent.

Projects are validated, verified and approved by the same DOE. Even with TÜV SÜD's best intentions, given the pressures DOEs are currently facing to do very fast and low cost evaluations, the possible conflict of interest is real.* Yet, since the standard is very new and few projects have been implemented it remains to be seen if these concerns prove to be valid.

* TÜV SÜD responded to this criticism:

The well established internal quality control processes and the general relevance of transparent procedures within a company for which auditing is a core business activity, create the safeguards, which ensure that standard definition does not constitute a conflict of interest with validation and verification. (e-mail communication, Markus Knödlseeder, 14/11/07)

Double Counting in Annex 1 Countries

The VER+ standard allows projects in any country. For Annex 1 countries they stipulate that the corresponding amount of AAUs are retired or that the generated VER+ credits are not to be transferred out of the country. We agree that the first provision avoids double counting but do not see how VERs used within the country avoids double counting. We therefore see the second alternative as insufficient to avoid double counting.

Co-Benefits

VER+ does not require a local stakeholder process and does not focus on enhancing co-benefits. For buyers who place value on these co-benefits, VER+ would not be a sufficient standard.

Future of VER+

There are several reasons why project developers might choose VER+ over CDM. In comparison to CDM, VER+ provides more flexibility on methodologies, which speeds up validation and verification. A project specific approach as defined for JI can be used for those project settings where a CDM approved methodology is not available or fully applicable. The fees for the incorporation of VER+ credits to the BlueRegistry are usually lower than those covered by UNFCCC for registration and issuance of CDM projects.

Given the proliferation of standards, it remains to be seen how well the VER+ will be able to establish itself. Although TÜV SÜD is well respected in the industry, the VER+ was developed by a single DOE and does not have the wide NGO or industry-based support that the Gold Standard and the VCS have. It is therefore unclear how widely the VER+ will be used.

CHICAGO CLIMATE EXCHANGE (CCX)

<http://www.chicagoclimatex.com>

1. Overview

Type of Standard

The Chicago Climate Exchange (CCX) is a voluntary GHG emissions cap-and-trade scheme based in North America. Although participation is voluntary, compliance with emission reduction objectives is legally binding once a member joins. CCX has as part of its cap-and-trade scheme an offset programme with a full-fledged carbon offset standard. CCX members commit to reduce their emissions by a fixed amount below the established baseline level.^{*} Members who cannot achieve the reduction target through cutting their emissions internally can meet their compliance commitment by purchasing emission allowances (called Carbon Financial Instruments; CFI) through CCX's electronic trading platform from other CCX Members

* In the first phase of the scheme, from 2003 to 2006, members agreed to cut their emissions by 1 per cent each year below their annual average emissions for the period 1998 to 2001, thereby by achieving a reduction of 4 per cent by the end of the fourth year. For the second phase from 2007 to 2010, the original members have to further cut their annual emissions to achieve the target of six per cent by 2010. The new members who did not participate in the first phase have to achieve the same target by 2010 by reducing their emissions by 1.5 per cent each year.

that reduce their emissions beyond the reduction target. Offsets from projects implemented through the CCX offset programme can also be used to comply with reduction targets. Total use of offsets for compliance is limited to no more than one half of the required reductions.

History of Standard

In 2000, a group of researchers led by Richard Sandor at Northwestern University carried out a feasibility study on the viability of a cap-and-trade market to reduce greenhouse gas (GHG) emissions in the US. Through 2002, they developed the rules and protocols required to establish the scheme and, by 2003, they launched trading operations with 13 members that made voluntary but legally binding commitments to reduce six GHGs. Total membership has grown to almost 400 entities.

Administrative Bodies

CCX Committee on Offsets is responsible for reviewing and approving proposed offset projects. The offset committee has currently approximately 12 members. Each member is appointed by the CCX Executive Committee for a 1 year appointment with the possibility of renewal.

External Advisory Board provides external strategic input to the CCX team and includes experts from the environmental, business, academic and policy-making communities.

Technical Advisory Committees are established by request of each CCX standing committee or on an ad-hoc basis. These technical committees are usually comprised of outside experts. Currently CCX has technical advisory committees on agricultural methane capture, landfill methane capture, soil carbon sequestration for conservation tillage and rangeland soils, forestry and ozone depleting substances.

CCX Committee on Forestry is responsible, among other things, for reviewing proposed forestry offset projects.

CCX Regulatory Services Provider is the *Financial Industry Regulatory Authority (FINRA)*, the largest non-governmental regulator for all securities firms doing business in the United States, which provides external verification of the baseline and annual emissions report of each member, monitors CCX trading activity and reviews verifiers' reports for offset projects.

Third-party Offset Project Auditors are called 'verifiers' and are approved by CCX for each project type to verify an offset project's annual GHG sequestration or destruction. There are currently 29 approved auditors (12/07).

Financing of the Standard Organisation

Climate Exchange PLC is a publicly listed company on the AIM division of the London Stock Exchange. Financials of Climate Exchange, including CCX, are available to the public. The operations and management of the exchange is financed primarily through trading and offset registration fees as well as through enrolment and annual fees generated from its members.

Recognition of Other Standards

The CCX allows trading of credits generated in some projects registered under the CDM. Such projects must be approved by the CCX Offsets Committee and must retire their CERs in exchange for receiving CCX credits.

Number of Projects registered and offsets issued

44 offset projects have been issued 20.82 million metric tonnes of CO₂e offsets since the scheme's inception in 2003 as of 28 November 2007. (<http://www.chicagoclimatex.com/offsets/projectReport.jsf>, accessed Nov 28, 2007)

2. Eligibility of Projects

Project Types

CCX accepts the following project types:

- **Energy efficiency and fuel switching**
- **Renewable energy**
- **Coal mine and landfill methane**
- **Agricultural methane** such as anaerobic digesters.
- **Agricultural soil carbon:** Project owners must make a minimum 5 year contractual commitment to continuous no-till, strip till or ridge till on enrolled acres.
- **Rangeland soil carbon:** Projects must take place within designated land resource regions. Further, non-degraded rangeland projects in specific locations that are managed to increase carbon sequestration through grazing land management that employs sustainable stocking rates, rotational grazing and seasonal use are eligible.
- **Forestry carbon:** a) Forestation and forest enrichment projects must be on deforested or degraded lands b) forest conservation projects in specified locations may be eligible if they are undertaken in conjunction with forestation on a contiguous site. CCX rules address permanence issues of forestry projects by requiring a carbon reserve pool equal to 20 percent of all offset credits issued for the project and the cancellation of reserve pool offsets in case of sequestration reversal.
- **Ozone depleting substance (ODS)** destruction is accepted only for chemicals that can no longer be produced and where there is no legal requirement to destroy remaining stocks.

Project Location

Most CCX offset projects to date are located in the US. In order to avoid double counting, CCX accepts projects in any country except in member states of the EU-ETS. Furthermore, CCX does not allow for the registration of projects in Annex 1 countries during the Kyoto period that might be counted under the country level inventory (AAU).

Project Size

There is no limit on the project size. However, projects with less than 10,000 metric tonnes of CO₂e cannot trade on the exchange directly but can do so through an offset aggregator.

Start Date

Projects selling offsets on the CCX should not have started earlier than January 1, 1999 for most project types. However, the earliest start date for forestry projects is January 1, 1990 and for HFC destruction projects is January 1, 2007.

Crediting Period

Most of the eligible project types can earn offsets for the period 2003 to 2010 (8 years). The exceptions include renewable energy projects, which can earn offsets from 2005 to 2010 (6 years), HFC destruction projects, which can earn offsets from 2007 to 2010 (4 years), and rangeland soil carbon projects, which can earn offset from 2006 to 2010 (5 years).

CDM Pre-registration Credits

CCX generally approves CDM pre-registration credits if all the CDM documentation is in place. CCX does not require any further additionality proof for such pre-registration VERs.

Project Funding Restriction

No funding restrictions.

Environmental & Social Impacts

Offset projects must comply with the rules and regulations of the host country. Beyond this legal prerequisite, CCX does not have any requirements for stakeholder involvement and other co-benefits. The vast majority of CCX offsets are implemented in developed countries where legal and regulatory frameworks already require assessment of environmental and social impacts. In cases where projects originate from a non-Annex I country, environmental and social impacts are considered by the offset committee on a case by case basis depending on the project type.

3. Additionality and Baselines

Additionality Requirements

Additionality requirements are primarily performance-based. Additionality criteria are incorporated into the eligibility criteria of the project types. The CCX requires that projects are new, beyond regulation and involved in highly unusual “best in class” practices. There is no formal project-specific assessment of additionality. Additionality of each project is reviewed by the CCX Offsets Committee.

Baselines & Methodologies

The baselines and methodologies for calculating emission reductions are defined for each project type through the use of specified crediting rates for eligible project activities. Some baselines are project-specific (e.g., large reforestation projects are credited relative to measured site-specific carbon levels prior to the start of the project). Other baselines are based on performance standards (e.g. avoided deforestation projects in Brazil are credited using predetermined annual deforestation rates for specific states within Brazil).

4. Validation and Registration (Initial Verification and Enrolment)

CCX does not distinguish between validation and verification. Both steps are usually done at the same time by the same auditor and are called “project verification and enrollment.” In other words, an initial validation of projects is optional. Credits are generated after verification.

Process

The following steps are involved in verifying or enrolling an offset project on the CCX:

1. An offset project owner submits a project proposal or questionnaire for an eligible project to the CCX.
2. The proposal is reviewed by the CCX Committee on Offsets and they provide a preliminary approval if the project is eligible (the project may be referred to scientific technical advisory committees, if required).
3. Once approved by the Committee, the project owner or aggregator must obtain an independent verification by a CCX-approved verifier (the verification may include site visits) to accurately assess a project’s annual GHG sequestration or destruction potential.
4. The verification reports are then reviewed by CCX staff as well as the CCX provider of regulatory services, FINRA, for completeness and accuracy.
5. The offset provider can then join the CCX and enroll the project (if the offset provider is already a member or offset aggregator, then the new project is enrolled independently or aggregated together with other projects).

Key Requirements

1. Eligible project proposal
2. Verification Statement by the third-part auditor

5. Monitoring, Verification and Certification (Annual Verification and Issuance)

Process

The steps involved include:

1. The CCX-approved auditors verify the project's actual annual GHG sequestration or destruction.
2. The CCX then issues the offset provider or aggregator Carbon Financial Instrument® (CFI™) contracts equivalent to the quantity of emission sequestered or destroyed (one CFI is equivalent to 100 metric tonnes of CO₂e).

Key Requirements

Verification Statement by the third-part auditor are required.

6. Evaluation of Auditors

Auditors are approved for each project type. Once approved the CCX does not have a formal process in place to evaluate and sanction auditors in case of underperformance.

7. Registries

Offset project developers can participate in CCX by registering offsets either as Offset Providers or Offset Aggregators. An Offset Provider is an owner of an

offset project that registers and sells offsets directly on the Exchange. An Offset Aggregator is an entity that serves as the administrative representative for multiple offset-generating projects on behalf of multiple project owners. The CCX Trading System has three components:

1. The CCX Registry

The CCX Registry is the electronic database that serves as the official record holder and transfer mechanism for Carbon Financial Instrument® (CFI™) contracts. All CCX Members have CCX Registry Accounts.

2. The CCX Trading Platform

The CCX Trading Platform is an internet-accessible marketplace in order to execute trades among CCX Registry Account holders and to complete and post trades that are established through private bilateral negotiations.

3. The Clearing and Settlement Platform

The Clearing and Settlement Platform processes daily information from the CCX Trading Platform on all trade activity.

8. Fees

Fees for CCX membership are USD 1,000-35,000 per year depending on the size and type of member. Offset registration fees are USD 0.12 per metric tonne from non-Annex I countries and USD 0.15 per metric tonne from Annex I countries. The trading fee is USD 0.05 per metric tonne. Trading and offset registration fees are posted on the CCX website and are subject to change.

Authors' Comments on CCX

CCX has been a pioneer in establishing a cap-and-trade system. It was the first such system established in North America and it has given companies the opportunity to learn and gain experience with emissions reduction commitments and carbon trading. Despite these very positive aspects of CCX, there have been several points of criticism of CCX in general (as a cap-and-trade system) and of CCX's offset programme. We first discuss the offset programme:

Co-Benefits

CCX does not require a local stakeholder consultation process and does not focus on enhancing co-benefits. For buyers who place value on these co-benefits, CCX would not be a sufficient standard.

Additionality

There has been significant criticism of the lack of additionality of some CCX offsets, in particular those involving no-till agriculture. There were several documented instances where farmers received carbon offset revenue for practicing no-till agriculture despite the fact that these farmers had been practicing no till for many years already.*

* J. Goodell, "Capital Pollution Solution?" New York Times Magazine (July 30, 2006).

CCX argues that it would be unfair if the proactive farmer who has been practicing no-till cannot sell his carbon credits, whereas a farmer who just started doing so in order to get revenue can earn credit. This argumentation in favour of 'rewarding early action' with carbon credits conflates two separate issues:

Environmental integrity: 'Rewarding early action' with carbon credits undermines the environmental integrity of offsets: If non-additional credits enter a cap-and-trade system, emissions are actually increasing because the buyer of the non-additional offsets will continue to emit whilst no further emissions reductions are achieved through the offset projects.

Fairness to early actors: it is true that additionality raises an equity issue: Individuals who have acted as pioneers and have already been engaged in non-traditional low-carbon practices such as no-till agriculture will not be able to sell their carbon credits because their actions are by definition non-additional (they happened for other reasons than the carbon offset market).

In order to preserve the environmental integrity of the broader offsets market, the fairness concern would need to be addressed via measures other than handing out non-additional carbon credits (e.g. early action provisions, tax/subsidy treatment, discounting of credits, etc).*

The following points apply to CCX in general:

Transparency of CCX

Several groups have in the past criticized CCX for its general lack of transparency.[†] CCX has responded to this criticism by making its rule book and many of the methodologies available on its website. We welcome this increase in transparency which will enable a more independent evaluation of project methodologies.

Accomplishments of CCX and additionality of CFIs

Companies who voluntarily signed on to CCX are a self-selecting subset of corporations who are likely to be confident that they can comply or even over comply with the commitments. It is therefore difficult to assess the achievements of the CCX per se. The very low prices of CFIs indicate that many of the member companies of CCX have over-complied with their commitments and, conversely, that the CCX targets are not stringent enough to exert any pressure above and beyond the companies' expected emission levels. If the cap in a cap-and-trade system is low and there is over-compliance, the cap may not be leading to any reductions beyond business-as-usual. There is a risk that carbon offsets from unspecified CFIs do not actually lead to emissions reductions beyond business-as-usual.

Future of CCX

CCX was the first cap-and-trade system that was established in the US and as such has played a innovative and valuable role in bringing carbon trading to the US. It is unclear how CCX will function if the US adopts a mandatory cap-and-trade programme. It is possible that CCX could become largely a trading platform and exchange, deferring to government authorities to define rules and procedures and to certify reductions.

* CCX responded to this criticism by claiming that tillage can only be ensured through a contract and a verification process, which CCX provides. "There is no guarantee it would go on without a contract with CCX." No-till has been practiced for decades. Where it can rightfully be assumed that more farmers will change to no-till now that revenue from offsets are available, the argument that without the offsets the amount of no-till agriculture would actually decrease below the current level is not supported. CCX further states:

The primary concern was that we not encourage perverse actions that would encourage people to game the system to qualify as "new no-tillers" by virtue of the fact that they have tilled up fields that formerly had been subject to conservation tillage that removes CO₂ from the air. We did not want to see reversals of stored carbon dioxide with the resulting release to the atmosphere. (Michael Walsh, e-mail communication 12/21/08)

Although a valid argument, it is unclear how many farmers would choose to start to till again, since they had enough incentive to switch their tilling practice before offsets were available. Even more importantly, the argument ignores the issue that non-additional offsets will lead to a de facto increase in emissions under a cap-and-trade system (see chapter 5.1.)

† Dale S. Bryk. (2006). 'States and Cities Should Not Join the Chicago Climate Exchange.' Natural Resources Defense Council

7.3 Offset Standard Screens

Offset Standard Screens are not full-fledged standards by themselves but accept projects that were implemented under other standards and adhere to their screening standards.

VOLUNTARY OFFSET STANDARD (VOS)

<http://www.carboninvestors.org/>

1. Overview

Type of Standard

The Voluntary Offset Standard (VOS) is a carbon offset screen that accepts other standards and methodologies using certain screening criteria. It currently accepts Gold Standards VER projects and projects that employ CDM procedures but which are implemented in countries that have not ratified the Kyoto Protocol and are therefore not eligible for CDM.

History of Standard

The International Carbon Investors and Services (INCIS) launched the VOS in June 2007. INCIS is a not-for-profit association of large investment companies that provide carbon-related investments and services. INCIS has 26 members (as of November 2007).

Administrative Bodies

Since the VOS is a new standard, many of its administrative structures are not yet in place.

Members: INCIS was initially set up as the “European Carbon Investors and Services” but has since its launch expanded to represent the interests of 26 members based both within and outside of Europe. These include, among others, ABN AMRO, Baker & McKenzie, Barclays Capital, Climate Change Capital, Credit Suisse, Deutsche Bank, Fortis, ING, MGM International, Morgan Stanley, and Standard Bank.

Auditors: UNFCCC approved DOEs verify and approve projects.

Financing of the Standard Organisation

The VOS is financed through INCIS membership fees and will further be financed through the issuance fees once its registry is established.

Recognition of Other Standards

The VOS accepts credits from CDM, JI, and Gold Standard CER and VER projects. Other VER standards (or specific methodologies approved under these additional standards) may be recognised under the VOS in the future by INCIS.

Number of Projects

No information is available: the VOS relies upon DOE certification so there will be no central entity to collect VOS project numbers until a registry is established.

2. Eligibility of Projects

Project Type

VOS accepts project types covered under the CDM/JI mechanism, with the exception of new HFC projects and 20 MW-plus hydroelectric dams unless they meet the criteria and guidelines of the World Commission on Dams.

Project Location

Projects are allowed in any country except those based in countries covered by a scheme for greenhouse gas emission allowance trading, such as the EU-ETS, if there is no mechanism in place to retire the equivalent numbers of allowances in that country (e.g. retiring of AAUs).

Project Size

The limitations specified under CDM/JI mechanisms apply.

Start Date

The limitations specified under CDM/JI mechanisms apply.

Crediting Period

The same as CDM/JI and CDM Gold Standard

CDM Pre-registration Credits

Pre-registration VERs are generally accepted by the VOS. Such VERs can be issued from the project start date if the project has been successfully validated by a DOE as meeting the CDM standard, including additionality, and the number of VERs has been verified by a different DOE.

Project Funding Restriction

The limitations specified under CDM/JI mechanisms apply.

Environmental & Social Impacts

The limitations specified under CDM/JI mechanisms apply. If the credits are GS, then Gold Standard rules apply.

3. Additionality and Baselines

The rules and guidelines specified under the CDM/JI mechanisms and the Gold Standard apply.

4. Validation & Registration

For GS VERs: validation is done through the Gold Standard. For CDM standard VERs: validation is done through DOE certification.

5. Monitoring, Verification & Certification

For GS VERs: verification is done through the Gold Standard. For CDM standard VERs: verification is done through DOE certification.

6. Evaluation of Auditors

The VOS relies on the review processes of the CDM and does not have its own review process for auditors.

7. Registries

The VOS is planning to establish its own registry.

8. Fees

For GS VERs: see the Gold Standard section. For CDM standard VERs: the DOE validation and verification costs. Registry costs are yet to be determined.

Authors' Comments on VOS

The VOS standard screen is supported by many of the heavy weights in the financial industry. This is an indication that these financial players are concerned about the risk they are taking by trading VERs from an unregulated market. Because of the support by these powerful financial players, the VOS could potentially play an important role.

Yet currently the VOS seems somewhat vague. It is difficult to get any specific information about the VOS. There is little information available on the website or in printed materials.

Currently the VOS only accepts VERs from projects implemented using CDM methodologies and Gold Standard offsets. In terms of VER projects implemented using CDM methodologies, the VOS is similar to the VER+, yet has fewer defined organisational structures and procedures. It is still unclear how the decision making structures for approval of methodologies or other standards will look. For these reasons, it is unclear how important a role the VOS will play in the voluntary offset market.

7.4 Bio-Sequestration Standards

CDM AFFORESTATION AND REFORESTATION STANDARD (CDM A/R)

1. Overview

This section focuses on CDM's bio-sequestration rules only. For a complete description of the CDM, see chapter 7.1.

Number of Projects

As of September 2007, only 10 afforestation/ reforestation projects are registered with CDM. (Source: <http://www.cdmpipeline.org/cdm-projects-type.htm>)

2. Eligibility of Projects

Project Type

CDM accepts afforestation* or reforestation† projects. CDM forestry projects can only be implemented on land (a) that is not forested at the start of the project activity; (b) which was not recently harvested; and (c) which is not likely to become forested in the near future without human intervention. All other forms of biological sequestration or land-based emissions reduction activities, including avoided deforestation, are currently not allowed.

The requirements for registering, validating, and certifying forestry projects are the same as for other project types. However, the following requirements are specifically for CDM forestry projects.

Leakage

Specific methods to account for leakage are developed under each baseline methodology. Methodologies must identify the sources of leakage and explain which sources of leakage are to be calculated, and which can be neglected. They must also specify any relevant calculations, parameters, and coefficients; indicate how values will be obtained; and describe uncertainties associated with key parameters. Specific methodologies may identify circumstances in which a particular source of leakage can be “neglected” or ignored. Such exclusions must be justified.

CDM does not account for international leakage and market shifting.

Permanence

To address the risk that carbon might be re-released in the atmosphere due to forest destruction, CERs from forestry CDM projects produce **temporary emissions credits**. Specifically, these are either termed “temporary CERs” (tCERs) or “long-term CERs” (lCERs). Both types of CERs have expiration dates, after which they must be replaced by another tradable emissions unit under the Kyoto Protocol (e.g., standard CERs, AAUs, ERUs, or RMUs).

If an Annex 1 country uses a tCER for compliance it must replace it with a permanent Kyoto unit or an unexpired tCER in the next commitment period. If the project is still performing as expected, the new tCERs will just replace the expired ones. If the project fails during the first year of the commitment period, the tCERs will not have to be replaced until the end of that commitment period. This reduces the risk for the buyer who can plan for the whole commitment period.

lCERs expire at the end of the final crediting period for the project activity. lCERs may be cancelled if the verification reveals that the stored carbon for which they were issued got released back into the atmosphere. Upon cancellation, they must be replaced by another Kyoto Protocol emissions trading unit.

Crediting Periods

CDM forestry projects have either a single 30-year crediting period, or 20-year crediting periods that are renewable up to two times.

Other Rules

During the first commitment period, Annex 1 countries are limited to using forestry credits for no more than 1% of their baseline emissions.

Authors' Comments on the CDM A/R

There have been very few implemented CDM A/R projects. The methodology requirements are complicated and require sophisticated measurements of carbon stocks.

CDM currently does not allow for REDD projects, yet deforestation remains a serious problem and contributes significantly to climate change. Many developing countries and NGOs have been advocating for the inclusion of REDD into CDM. Yet it is unclear how well suited CDM is for addressing deforestation. Even with carefully designed methodologies, (international) leakage is difficult to address in REDD projects. For authors' comments on the CDM, see chapter 7.1

* Afforestation: The direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources (Kyoto Definition).

† Reforestation: The direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to those lands that did not contain forest on 31 December 1989.

<http://www.v-c-s.org/afl.html>

This section focuses on bio-sequestration rules only. For a complete description of the VCS, see chapter 7.1

1. Overview

Voluntary Carbon Standard (VCS) includes bio-sequestration and land-based emissions reductions projects and has developed a specific set of rules to address the particular issues and risks associated with these project types. The VCS uses the acronym AFOLU (Agriculture, Forestry and Other Land Use) for its bio-sequestration projects.

Number of Projects

The VCS AFOLU standards were launched on November 19th, 2007, and new methodologies and projects have yet to be approved.

2. Eligibility of Projects

Project Type

The following types of projects are acceptable under the VCS AFOLU:

- Afforestation, Reforestation and Revegetation (ARR)
- Agricultural Land Management (ALM)
 - Improved cropland management
 - Improved grassland management
 - Cropland to grassland conversions
- Improved Forest Management (IFM)
 - Conventional to Reduced Impact Logging
 - Convert logged to protected forest
 - Extend rotation age
 - Conversion of low-productive forests to productive forests
- Reducing Emissions from Deforestation (RED)
- Further activities can be added in the future

Leakage

The geographical area subject to potential leakage must be identified ex-ante, and any potential leakage subtracted from the net carbon benefits generated. Each project activity type has specific rules governing how leakage must be addressed.

Given the potential for regional markets to shift leakage from improved forest management projects (if they reduce overall timber supply), the VCS provides default leakage factors to ensure that potential leakage impacts are captured and subtracted. These default values can range from 10% to 70%.

In the case of RED projects, an analysis of agents and drivers of deforestation must be presented to the verifier, as well as a description of the measures that will be implemented to address them (e.g., building in sustainable agricultural intensification practices when shifting agriculture is a deforestation driver, or incorporating fast-growing wood lots to address local fuel wood or timber needs). The identified factors must subsequently be monitored on a regular basis. Depending on the extent of possible leakage, the area subject to leakage monitoring could encompass the entire host-country. If significant leakage that is directly attributable to the project is likely to occur beyond this area (such that it cannot be monitored), the activity is not eligible.

In line with the CDM, VCS AFOLU does not account for international leakage or international market shifting.

Permanence

Unlike CDM, the VCS does not issue temporary credits. VCS AFOLU projects produce permanent VCUs that are fully fungible regardless of the project type generating them. VCS AFOLU projects set aside a portion of all their credits generated into a buffer reserve to mitigate non-permanence risk. The buffer credits from all projects are held in a single pooled VCS buffer account to act as insurance against unanticipated project failure.

The buffers are sized depending on the risk level of a project. Projects with higher risk of (partial) failure must include a larger buffer than projects with smaller risks.

Risk Class	RED Buffer	ARR Buffer
High	20–30%	40–60%
Medium	10–20%	20–40%
Low	5–10%	5–20%

This risk assessment and subsequent buffer determination is conducted by two separate independent verifiers to ensure that a conservative number of credits are set aside.

The buffer solution to permanence issues in bio-sequestration projects reduces the risk to the buyer and seller of the offsets because the buffer acts as a guarantee. Credits in the buffer are cancelled when carbon is lost from the project compared to a previous issuance event, or should the project not be re-verified in the future. The buffer approach is meant to encourage developers to design projects for longer time-horizons

and adopt strong risk mitigation strategies, since long-term projects with a low risk profile will be subject to a lower buffer withholding requirement.

Buffers can be drawn upon over time as project's longevity is established and risks shown to be effectively mitigated. 15% of project's buffer is released every 5 years at re-verification. For example, a medium-risk project starting out with a 30% buffer would have 15% of this (or 4.5% of total credits) released at its next verification event five years later. This 15% release would continue (e.g., at next verification would release 15% of 25.5% of credits from buffer), so that by 50 years after the first verification (or 55+ years since project start), assuming that the project's risks have been shown to be effectively managed, the project would be subject to a ~6% buffer withholding.

Verification of the project is in theory optional, but it is in interest of project proponents to regularly submit verification reports to the VCS because if a project fails to submit a verification report to the VCS within five years from latest verification, 50% of the buffer credits are cancelled. After another five years, all remaining buffer credits are cancelled. Projects may claim cancelled credits in the future by submitting a new verification before the end of the crediting period.

Authors' Comments on VCS AFOLU

The VCS AFOLU rules are thorough and innovative and they address many permanence and additionality concerns. It is also the first carbon standard to cover all the major land use activities, whether forestry or agricultur related, under a single verification framework. Only once projects have been implemented will it be possible to fully evaluate the quality of the standard.

Co-Benefits

VCS AFOLU does not require a local stakeholder process beyond what is required by law and does not focus on enhancing co-benefits. For buyers who place value on these co-benefits, VCS AFOLU alone would not be a sufficient standard but could be combined with a standard such as the CCBS. For authors' comments on the VCS, see chapter 7.1.

To ensure the environmental integrity of the buffer approach the VCS will conduct "truing up" of the overall VCS buffer pool every few years. A review of existing VCS verification reports for all AFOLU projects under the VCS would flag the projects that have failed or underperformed and then identify their common characteristics. The buffer values and/or risk criteria for VCS projects going forward would then be adjusted accordingly.

Crediting Periods

VCS crediting period for AFOLU projects are the same as the life of the project, with a minimum of 20 years and a maximum of 100 years.

Socio-Economic and Environmental Impacts

VCS requires all AFOLU projects to "identify potential negative environmental and/or socio-economic impacts they might have, and effectively mitigate them prior to generating VCUs." However, VCS does not monitor social and environmental impacts; project developers simply have to demonstrate to verifiers that there are no negative social and environmental impacts.

<http://www.climate-standards.org/>

Introduction

Type of Standard

The Climate, Community & Biodiversity Standards (CCBS) is a project design standard and offers rules and guidance for project design and development. It is intended to be applied early on during a project's design phase to ensure robust project design and local community and biodiversity benefits. It does not verify quantified carbon offsets nor does it provide a registry. The CCBS focus exclusively on land-based bio-sequestration and mitigation projects and require social and environmental benefits from such projects.

History of Standard

The CCBS was developed by the Climate, Community and Biodiversity Alliance (CCBA) with feedback and suggestions from independent experts. CCBA is a partnership of non-governmental organizations, corporations and research institutes, such as Conservation International, The Nature Conservancy, CARE, Sustainable Forestry Management, BP and CATIE. The first edition was released in May 2005.

Administrative Bodies

CCB Alliance is formed by representatives from each member organisation. The alliance currently has 13 members and makes decisions about changes to the standards. It also works closely with the auditors, advising them on interpretation and application of the standards.

Working groups are comprised of alliance members and external advisors and are appointed when needed to address specific issues. Working groups proposals for changes must be approved by the Alliance.

Third-party auditors are certified DOEs under the CDM for afforestation and reforestation – organizations that are approved to evaluate CDM projects – or evaluators who are certified under the Forest Stewardship Council*. Validation and verification can be done by the same auditor.

* The Forest Stewardship Council (FSC, www.fsc.org/en/) is a non-profit organisation with a mission "to promote environmentally appropriate, socially beneficial and economically viable management of the world's forests". It certifies sustainably managed forestry operations, and tracks their timber through the supply chain to the end product, which can then carry the FSC ecolabel.

Financing of the Standard Organisation

The CCBS are managed by the CCBA which is supported by contributions from alliance member organizations and by foundation grants.

Recognition of Other Standards

Because CCBS is a project design standard only, and not a full fledged carbon offset standard, project developers who want to sell certified or verified emissions have to apply another standard to get certification and registration of their offsets. About 30% of the projects are developed as CDM projects that will generate CERs. 70% of the projects are looking to sell their offsets in the voluntary market.

Projects may combine the use of several different standards (e.g. CCBS to ensure validity of design to generate carbon credits with social and environmental benefits, FSC for certification of timber products, and the VCS for verification and registration of carbon credits). Using different standards might potentially help projects attract different funders and product buyers at different stages in the project cycle.

Number of Projects

As of September 2007, two projects have been validated against CCBS, a further five projects are undergoing validation and at least 20 more projects plan for CCBS validation in the coming few months. Over 70 projects are under development using the CCB Standards. The pool is growing by a few projects every month.

Ex-Ante Sale of Carbon Offsets

Some CCBS projects are selling ex-ante credits. Some are planning to sell a mixture of ex-ante and ex-post credits. Ex-ante credits enable projects to raise funds for project implementation. Because of the risk that is associated with purchasing ex-ante credits, buyers are often offered preferential rates for such up-front credits. In cases where the buyer requires carbon verification, the projects can, once real carbon benefits have been generated (5-12 years for most reforestation projects and shorter for avoided deforestation and degradation), apply a carbon verification standard such as the CDM or VCS.

As a design standard, CCBS does not verify emissions reductions. The offsets must be verified through another standard (e.g., VCS or CDM). When the carbon credits are verified, they are tracked by the registry associated with the carbon accounting standard used. It is the responsibility of the project proponent to register and cancel any ex-ante carbon credits that might be sold in advance of verification, in order to prevent double selling.

2. Eligibility of Projects

Project Type

CCBS focuses on land-based climate change mitigation projects, and accepts the following project types:

- primary or secondary forest conservation;
- reforestation or re-vegetation;
- agro-forestry plantations;
- densification and enrichment planting;
- introduction of new cultivation practices;
- introduction of new timber harvesting and/or processing practices (e.g., reduced impact logging);
- reduced tillage on cropland;
- improved livestock management; etc.

Project Location

Projects can be located in industrialized and developing countries. The revised version of the Standards – CCBS (2008) – will include rules to prevent potential double counting of Annex 1 based projects.

Project Size

There is no restriction on project size.

Start Date

There is no restriction on project start date but projects must have credible documentation for baselines from the start of the accounting period for carbon, community and biodiversity benefits.

Crediting Period

The CCBS has no rules on crediting periods because it is solely a project design standard.

CDM Pre-registration Credits

N/A

Project Funding Restriction

No restrictions on funding sources. On the contrary, since offset revenue alone is usually not enough to ensure project viability, many projects rely on co-funding through other means.

Environmental & Social Impacts

CCBS projects must generate net positive impacts on biodiversity. The standard employs a screen to rule out negative impacts and a point system to reward additional environmental benefits. The screen stipulates that projects cannot have negative effects on species included in the IUCN Red List of threatened species or species on nationally recognized lists. Invasive species or genetically modified organisms cannot be used in a project. CCBS rewards projects with an additional point each for the use of native species and water and soil resource enhancement.

Projects must generate net positive impacts on the social and economic wellbeing of communities and

must mitigate potential negative effects caused by the project on-site and offsite.

Stakeholder involvement is required and must be documented during all phases of project development. Stakeholders must have an opportunity before the project design is finalized, to raise concerns about potential negative impacts, express desired outcomes and provide input on the project design. The project design must include a process for hearing, responding to and resolving community grievances within a reasonable time period. The overall net social and economic effect of the project has to be positive. Additional credit is given for capacity building activities and best practices in community involvement.

Leakage

Decreased carbon stocks or increased emissions of non-CO₂ GHGs outside the project boundary resulting from project activities need to be quantified and mitigated. The project proponents must:

- 1) *Estimate potential offsite decreases in carbon stocks (increases in emissions or decreases in sequestration) due to project activities.*
- 2) *Document how negative offsite impacts resulting from project activities will be mitigated, and estimate the extent to which such impacts will be reduced.*
- 3) *Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project. The total net effect, equal to the net increase in onsite carbon minus negative offsite climate impacts, must be positive. (Climate, Community and Biodiversity Project Design Standards, First Edition, p. 17)*

Permanence

Permanence is addressed by requiring that projects identify potential risks up front and design in measures to mitigate potential reversals of carbon, community and biodiversity gains, including establishing buffer zones. Yet because CCBS is a project design standard, it does not have specific permanence requirements such as the issuance of temporary offsets.

3. Additionality and Baselines

Additionality Requirements

The additionality tests for CCBS are project based and specified by individual methodologies.

The CCBS require:

Step 1: Regulatory Surplus: Project developers must prove that existing laws or regulations would not have required that project activities be undertaken anyway. The standard also allows for project developers to make claims when a law is in existence but is not enforced e.g.

if heavy logging happens in an area that is pro forma under protection.

Step 2: Barriers: Financial, Lack of Capacity, Institutional or Market Barriers or Common Practice: Several additionality tests are required. The project proponents must provide analyses (poverty assessments, farming knowledge assessments, remote sensing analysis, etc) showing that without the project, improved land-use practices would be unlikely to materialize.

Baselines & Methodologies

CCBS relies on methods and tools developed by other organizations and standards for their baseline calculations. For example, to estimate net change in carbon stocks they accept the methodologies of the IPCC's Good Practice Guidance (IPCC GPG) and any methodology approved by the CDM.

The baseline calculations must be based on clearly defined and defensible assumptions about how project activities will alter carbon stocks and non-CO₂ GHG emissions over the duration of the project or the project accounting period.

4. Validation & Registration

Process

Once a project has been designed, a third-party auditor validates the project. After reviewing relevant project documents, a site visit, and taking account of the comments received during a 21-day public comment period, the auditor approves or rejects the project. The CCB Alliance works very closely with the auditors, commenting on and reviewing project documentation. Yet it is ultimately the auditor who makes the decision to approve or reject a project.

Key Requirements

The CCBS include fifteen required criteria and eight optional "point-scoring" criteria. Silver or Gold status is awarded to exceptionally designed projects that go beyond the basic requirements. Such Gold and Silver projects use primarily native species, enhance water and soil resources, build community capacity, and adapt to climate change and climate variability.

Authors' Comments on CCBS

Project Design Standard

The CCBS is intended to be used as a design tool to ensure robust multiple-benefits will be delivered. Project design standards for forestry projects are especially valuable and important, since carbon verification standards typically do not come into play until many years after the project has been designed and after upfront investment has been secured.

5. Monitoring, Verification & Certification

Process

To keep its CCB validation, each project must be verified every 5 years. Verification includes a project document review by the auditor and a site visit to check on project implementation and monitoring results in addition to any changes in project design.

The validation and the verification can be done by the same auditor. Currently all of the CCB projects are less than 5 years old and have therefore not yet been verified. CCBA intends to develop and publish further rules and guidance on project verification.

Key Requirements

The CCB verification does not include a quantitative certification of the carbon benefits but is a qualitative evaluation that confirms carbon benefits as well as the environmental and social benefits of the project.

6. Evaluation of Auditors

The accreditation of auditors lies with the CCB Alliance currently limited to DOE's accredited by CDM EB for Afforestation and Reforestation auditors accredited by the Forestry Stewardship Council (FSC). There is no formal procedure in place to "spot check" auditors but the CCB Alliance could potentially decide to ban or restrict certain auditors that under-perform.

7. Registries

Because CCBS is a Project Design Standard it does not have a registry accredited for its offsets.

8. Fees

Cost for validation of a project ranges from €3,500 to €10,000. If the validation is being done in conjunction with CDM, validation costs are lower for CCBS than for stand alone projects, because many of the requirements for CCBS will already have been fulfilled through the CDM requirements (e.g. baseline calculations).

Co-Benefits

CCBS emphasizes the social and environmental benefits of projects and has developed a set of useful tools and guidelines to ensure and measure these co-benefits. Some of their criteria are quite specific (e.g. biodiversity rules) while others are defined in very general terms (e.g. stakeholder and capacity building rules). Using general language to define requirements gives the project developer the flexibility to address the issue in a way that fits the project best yet it also places more onus on the auditor's judgment when making the assessment. Quality of projects can therefore only be assured if auditors are truly independent and adhere to high standards in their work.

No Separation of Verification and Approval of Projects

Under the CCBS it is the auditors themselves that approve the projects. Given the pressures on auditors and conflict of interest discussed earlier, we see the lack of an accrediting board as a potential weakness of the CCBS.

The CCBA is currently working fairly actively with auditors, because the validation procedures have only recently been defined and some initial guidance was needed. Also, the CCBA has been soliciting auditor feedback to help inform the development of the 2nd edition of the CCBS (to be developed in 2008). However, CCBA expects less and less engagement with projects and auditors. This separation of CCBA, auditors and project developers is needed since it helps minimize a potential conflict of interest between the project developer and the CCBS.

PLAN VIVO SYSTEM

www.planvivo.org

1. Introduction

Type of Standard

Plan Vivo is an Offset Project Method for small scale LULUCF projects with a focus on promoting sustainable development and improving rural livelihoods and ecosystems. Plan Vivo works very closely with rural communities, emphasizes participatory design, ongoing stakeholder consultation, and the use of native species. The Plan Vivo Foundation certifies and issues only ex-ante credits, called *Plan Vivo Certificates*, and therefore does not verify ex-post offsets.

History of Standard

The Plan Vivo System was initiated in 1994 for a research project in southern Mexico. The system was developed by the Edinburgh Centre for Carbon Management (ECCM, <http://www.eccm.uk.com/>), a consulting company that focuses on climate change mitigation strategies and policies, in partnership with El Colegio de la Frontera Sur (ECOSUR), the University of Edinburgh and other local organisations with funding from the UK Department for International Development (DFID).

Administrative Bodies

Plan Vivo is currently managed by the Plan Vivo Foundation (formerly BioClimate Research and Development), a non-profit focused on promoting actions to reconcile human development and environmental change. The Foundation reviews and

registers projects according to the Plan Vivo System, issues Plan Vivo Certificates annually following the submission and approval of each project's annual report, and acts as overall 'keeper' of the Plan Vivo System which is periodically reviewed in consultation with projects and other stakeholders. It also approves third-party verifiers and registers resellers of Plan Vivo Certificates.

Consultants are hired by Plan Vivo to review certain aspects of their projects. Because of the small number of projects, there is no established procedure for this. The Plan Vivo Foundation also conducts frequent field visits to projects in order to monitor their progress and see that evaluations are done as needed.

Project Developers: Plan Vivo works with local NGOs who function as project developers ('project coordinators'). They coordinate sales with the offset purchasers and administer payments to local farmers based on the achievement of 'monitoring targets'.

Financing of the Standard Organisation

The financing of the Plan Vivo Foundation is sourced primarily from a levy imposed on the issuance of Plan Vivo Certificates. They currently take USD 0.30 per tonne of carbon dioxide sold. Other sources of income come from project and resellers' registration fees.

Recognition of Other Standards

Plan Vivo does not currently work in conjunction with other standards.

Number of Projects

Plan Vivo currently has three projects (in Mexico, Uganda and Mozambique) and a few more are currently being reviewed.

Ex-Ante Sale of Carbon Offsets

Plan Vivo exclusively certifies ex-ante credits.

2. Eligibility of Projects

Project Type

Plan Vivo accepts the following project types: forest restoration; agroforestry/small plantations; forest protection and management; soil conservation and agricultural improvement.

Project Location

Plan Vivo projects are located in developing countries.

Project Size

There is no minimum or maximum size limitation for Plan Vivo projects. Projects generally expand in size over a number of years as more farmers hear about the project, learn more about the notion of selling carbon as a commodity and see it working in practice. The current Plan Vivo projects range in size from a carbon offset potential of 10,000 tCO₂/yr to 100,000 tCO₂/yr.

Start Date

In order to sell Plan Vivo Certificates, projects must first be registered as Plan Vivo projects. There is no time restriction on this.

Crediting Period

The crediting period varies from project to project. Farmers are reimbursed for sequestration activities for 5-15 years, yet carbon benefits are calculated over much longer time periods of up to 150 years.

CDM Pre-Registration Credits

N/A

Project Funding Restriction

No restrictions are imposed on funding sources. On the contrary, since carbon finance only becomes available once a project has gone through the process of feasibility studies, detailed project design, extensive training and registration, many projects rely on co-funding through other means during the initial stages. Projects are designed so that carbon payments will sustain the projects once they are fully functional..

Environmental & Social Impacts

Plan Vivo requires that all its projects provide additional benefits to the local environment and community through the development of sustainable land-use systems, planting of native species, and promotion of sustainable and improved livelihoods through the

diversification of income sources. Metrics for quantifying environmental and social benefits of Plan Vivo projects have recently been revised and standardized and can now be found in the Plan Vivo Standards.

Leakage

Leakage at individual plot level

To minimize leakage, each producer must show that they are not reducing their agricultural output below sustainable levels. In other words, a Plan Vivo project will not be registered unless the producer can live sustainably from their land under the plan, and has identified management objectives beyond receiving carbon payments (e.g. sustainable timber production, fruits or other non-timber products, agro-forestry).

Leakage at project level

Leakage is assessed for each land-use activity in the technical specifications, considering the local and regional trends, identifying potential leakage risks and mechanisms for controlling them. Some examples are given in the following table:

Land use activity	Potential leakage	Mitigation
Afforestation	Planting trees on agricultural land leads to further deforestation as farmers clear new areas of forest to plant crops	Ensure that farmers have sufficient land for agriculture and tree-planting
Forest Conservation	Leads to increased harvesting in other areas in order to meet demand for timber	Ensure that Plan Vivo management plan includes actions to improve sustainable timber production

Permanence

The Plan Vivo System contains a number of mechanisms that ensure permanence:

- Projects are initially assessed for their long-term viability, taking into account issues such as the organisational capacity and experience of all partners involved and the stability of the area.
- Producers selling carbon through the Plan Vivo System must enter into long-term sale agreements (contracts) with the in-country project coordinator which ensures that payments are made following monitoring against measurable and realistic goals.
- Producers must hold land tenure agreements (or community concession or similar usufruct rights) to demonstrate long-term ownership of land.

- All producers are under obligations to re-plant where trees die, for example from disease or extreme weather events, or if harvested for timber.
- Projects are internally monitored by Plan Vivo through the approval of annual reports and site visits.
- Each project maintains an unsold reserve of carbon credits called a risk buffer. The level of the risk buffer is set by the Plan Vivo Foundation according to its risk assessment of the project (normally 10-20%). The aim of the risk buffer is to cover any unexpected shortfall in carbon credits supplied to purchasers, for example due to extreme weather events, inaccuracies in baseline assumptions or producers defaulting on sale agreements.

3. Additionality and Baselines

Additionality Requirements

The additionality tools for Plan Vivo are project based. Additionality may be demonstrated through an analysis of the barriers to implementing activities in the absence of the project. These could include, for example, lack of finances, lack of technical expertise or prohibitive political or cultural environments. Only native species, which are unlikely to be planted without financial incentives in many countries where seedlings are difficult to find, may be planted. Commercial forestry projects are excluded from participation.

Baselines & Methodologies

Baselines are calculated at the project level and also modelled at the regional scale. Carbon sequestration potential, for the sale of ex-ante credits, is calculated on a per hectare basis for a specified length of time using information on the management regime, growing conditions, proposed species, growth rates, and proposed planting densities.

Technical specifications which describe the methodologies for and carbon potential of each land-use system (e.g. boundary planting, mixed species woodlot etc.) are commissioned by the Plan Vivo Foundation. All existing technical specifications can be viewed in the project pages of the Plan Vivo website (www.planvivo.org).

All Plan Vivo Technical Specifications are currently being externally reviewed by independent organisations including the University of Edinburgh and TerraCarbon. When this process is concluded the Plan Vivo Technical Advisory Board will discuss the results and the Plan Vivo Foundation will commission revisions and new Technical Specifications as necessary.

4. Validation & Registration

Process

Projects must register as Plan Vivo Concepts, which involves a desk review of the project's long-term viability. The project developer must describe the proposed project area and proposed activities and identify its sustainable development aims in consultation with the communities.

Key Requirements

Projects can be registered as Plan Vivo projects once they have:

1. A Plan Vivo Foundation approved set of technical specifications (used for describing land-use activities, carbon accounting, prescribing risk and other management activities and monitoring indicators and containing analyses of leakage, additionality and permanence)
2. A Plan Vivo Foundation approved operational manual (for describing project governance, systems for evaluating and monitoring Plan Vivos, administering payments and community-led planning)
3. Been validated by an expert reviewer chosen by BR&D.

5. Monitoring, Verification & Certification

Process

Monitoring is conducted throughout the crediting period by local technicians based on the protocol and indicators identified in the technical specifications of the Plan Vivo project approved by the Plan Vivo Foundation during project validation.

All operational projects must conduct and submit annual reports to the Plan Vivo Foundation using the standard Plan Vivo Annual Reporting Template. This report contains a full update of the project's status and development, including what sales and payments have been made, the results of monitoring and outcomes of consultations. The Plan Vivo Foundation reviews each annual report and issues Plan Vivo Certificates after approval of the report. Approval of annual reports may be qualified by imposing corrective actions, if the report shows the project fails to act in full compliance with the Plan Vivo System or Plan Vivo principles.

The Foundation may choose to follow up corrective actions with site visits where it is deemed necessary.

The local project coordinators monitor the work of each individual farmer and pay them when they are found to have reached their targets. The exact payment schedule varies with each project, but normally involves periodic monitoring and payments over periods of 10–15 years.

The Plan Vivo System currently does not require third-party verification, but has procedures for assisting projects in preparing for and choosing a verifier which must verify the project according to the Plan Vivo System (terms of reference are provided by the Plan Vivo Foundation). In the future as there are more Plan Vivo projects, it is likely that more specific verification requirement rules will be instituted.

Key Requirements

Each project must develop its own internal Monitoring Protocol based on the monitoring of indicators prescribed in the project's technical specifications. Any change to the Monitoring Protocol must be reported to the Plan Vivo Foundation in the project's annual report.

Specific requirements for each producer are set out in their individual sale agreement with the project coordinator. For example, a producer may receive 20% of the total payment after completing 50% of planting, and a further 10% after one year provided they have completed 100% of the planting.

6. Evaluation of Auditors

Plan Vivo has no formalized process to evaluate and sanction auditors in case of underperformance.

7. Registries

The Plan Vivo Foundation maintains a registry of carbon credits sold from Plan Vivo projects and issues Plan Vivo Certificates to purchasers accordingly. All carbon credits are sold as ex-ante payments. Each Certificate has a unique serial number which can be traced back to the project and exact producer, which ensures there is no double-counting of carbon credits.

8. Fees

Costs vary from project to project. Example operational costs can be found in project annual reports which can be viewed on the Plan Vivo website (www.planvivo.org).

The Plan Vivo Foundation currently charges no validation fee but takes a levy of USD 0.30 per Certificate issued. The Plan Vivo Foundation plans to implement registration fees for both projects and resellers, which are expected to be nominal amounts to cover administrative costs.

Authors' Comments on Plan Vivo

Grass-Roots Approach

Plan Vivo is a small standard organisation that works closely with rural communities. Because of the grass-roots approach of Plan Vivo, conservation and community benefits are very high, yet standards of this type usually remain small because they are very costly compared to cheap carbon options available on a globally traded carbon market. It is likely that Plan Vivo will stay small and not grow its portfolio beyond a handful of projects.

Ex-Ante Offsets

Farmers who participate in Plan Vivo are paid in regular installments over 10-15 years, yet they are expected to keep their trees standing for many decades. Plan Vivo's offset calculations are based on the trees remaining standing for decades after payments have ceased. Once all payments have been made to the farmers, there are no repercussions for farmers who decide to cut their trees down. Plan Vivo argues that the threat of non-compliance is largely mitigated through their project design: all Plan Vivo projects strive to improve the livelihoods of farmers and it is therefore in their own (economic) interest to keep the trees standing even after offset payments have ceased.

The authors welcome Plan Vivo's multi-benefit, grassroots approach that aims to help the very poorest, something that many larger offset projects and the CDM as a whole have so far failed to do (Schneider, 2007). Yet ex-ante credits cannot guarantee that actual emissions reductions will be realized. This should be clearly communicated to prospective buyers: Plan Vivo projects have high co-benefits but the carbon offsets are less secure than with ex-post credits.

7.5 Offset Accounting Protocols

Offset Accounting Protocols provide definitions and procedures to account for GHG reductions from offset projects yet they have no associated regulatory or administrative bodies and do not define eligibility criteria, or procedural requirements. Many of the full-fledged standards are based on such protocols, for example the VCS uses ISO-14064 methodologies. Below we describe the GHG Project Protocol and ISO 14064.

GHG PROTOCOL FOR PROJECT ACCOUNTING

www.ghgprotocol.org

1. Introduction

Type of Standard

The GHG Protocol Initiative has developed two separate protocols. The *Corporate Accounting and Reporting Standard* covers accounting for corporate GHG emissions inventories. The *GHG Protocol for Project Accounting* is an offset accounting protocol. It is a tool for quantifying and reporting GHG emissions reductions from GHG mitigation projects. It does not focus on verification, enforcement or co-benefits. We discuss only the latter and refer to it as the *GHG Protocol*.

History of Standard

The GHG Project Protocol was jointly developed by the *World Business Council for Sustainable Development (WBCSD)* and the *World Resources Institute (WRI)* in partnership with a coalition of businesses, NGOs, governmental and inter-governmental organizations. The initiative was launched in 1998 with the aim of developing internationally accepted GHG accounting and reporting standards. The *Corporate Accounting and Reporting Standard* (revised edition) was published in 2004. The *GHG Protocol for Project Accounting* was finalized and published in December 2005.

Administrative Bodies

The GHG Protocol is developed by the WRI and the WBCSD:

The World Resources Institute (WRI) is an environmental think tank “that goes beyond research to create practical ways to protect the Earth and improve people’s lives. [WRI’s] mission is to move human society to live in ways that protect Earth’s environment for current and future generations. [WRI’s] programme meets global challenges by using knowledge to catalyze public and private action.” (GHG Protocol, p. 145)

The World Business Council for Sustainable Development (WBCSD) is a coalition of 175 international companies “united by a shared commitment to sustainable development via the three pillars of economic growth, ecological balance and social progress. [WBCSD’s] members are drawn from more than 30 countries and 20 major industrial sectors.” (GHG Protocol, p. 145)

Financing of the Standard Organisation

The development of the GHG Project Protocol for Project Accounting was supported by numerous companies, organisations, and governmental sponsors, including Energy Foundation, US AID, US EPA, BP, Chevron Corporation, Ford, International Paper, SC Johnson, Dow, and Environment Canada.

Recognition of Other Standards

The GHG Project Protocol is programme neutral and is often used in conjunction with other standards or programs.

Number of Projects

N/A

2. Eligibility of Projects

Project Type

The GHG Project Protocol can be used to develop any project type. The protocol is supplemented with more specific guidelines for accounting for GHG emissions reductions in grid-connected electricity and LULUCF projects.

Project Location

Not defined under the GHG Protocol

Project Size

Not defined under the GHG Project Protocol

Start Date

Not defined under the GHG Project Protocol

Crediting Period

The protocol does not specify the duration of the crediting period and advises the project developer to err on the side of conservativeness.

The protocol recommends that the following aspects be taken into account when determining a crediting period:

- The pace at which economic conditions, technologies or practices are changing.
- The point at which the underlying assumptions, the barriers or the net benefits are likely to change significantly.

- Whether the baseline emissions are static or dynamic.

CDM Pre-Registration Credits

N/A

Project Funding Restriction

Not defined under the GHG Project Protocol

Environmental & Social Impacts

GHG Project Protocol does not address environmental and social impacts as they are not directly related to GHG reduction accounting and quantification per se. It acknowledges the importance of these issues but leaves it to the users of the protocol to determine policies in this regard and incorporate them in their programme's or standard's requirements.

3. Additionality and Baselines

Additionality Requirements

The GHG Protocol contains no formal requirements for additionality determination. It discusses additionality conceptually with respect to baseline determination (see below), but doesn't require specific additionality tests.

Baselines & Methodologies

The GHG Project Protocol offers guidance on the use of both project-specific and performance-based methods for estimating the baseline in a project. The protocol recommends the use of the performance standard procedure when:

- a number of similar projects are implemented
- obtaining verifiable data on alternatives to the project activity is difficult
- the project developer intends to keep confidential data that would need to be revealed if a project-specific standard were used
- the number of baseline candidates is limited or the GHG emission rate data for baseline candidates are difficult to obtain.

Author's Comments on GHG Protocol

The GHG Project Protocol can be used as a building block for a full-fledged offset standard. As such, it is a useful tool and has been used by many regulatory and voluntary schemes.

In this paper we evaluate the overall quality of offset standards rather than protocols. It would therefore go beyond the scope of this paper to comment on the specifics of the GHG Protocol.

4. Validation & Registration

Process

The GHG Project Protocol is only an accounting guidance document, and therefore does not provide guidance on validation or registration.

Key Requirements

N/A

5. Monitoring, Verification & Certification

Process

The GHG Project Protocol requires a plan for monitoring GHG emissions related to the primary and relevant significant secondary GHG effects of a project within the scope of the assessment boundary. The GHG Project Protocol does not cover verification or certification.

Key Requirements

The monitoring plan must describe the quality assurance and quality control measures that will be employed for data collection, processing and storage. It also requires the monitoring of data related to baseline parameters and assumptions to ensure their continuing validity.

6. Evaluation of Auditors

N/A

7. Registries

N/A

8. Fees

The GHG Project Protocol is free and publicly available for any GHG programme or project developer to use.

<http://www.iso.org>

1. Overview

Type of Standard

ISO 14064 is an offset protocol. It is an independent, voluntary GHG project accounting standard, and is deliberately policy neutral. The ISO 14064 standard consists of three parts. The first part (14064-1) specifies requirements for designing and developing organisation or entity-level GHG inventories. The second part (14064-2) details requirements for quantifying, monitoring and reporting emission reductions and removal enhancements from GHG projects. The third part (14064-3) provides requirements and guidance for the conducting of GHG information validation and verification.

Unlike the GHG Project Protocol, which has specific guidelines on what tools and accounting methods to use, ISO 14064 gives guidance on what to do but does not spell out the exact requirements. The requirements are usually spelled out only in general terms. For example, ISO points out that additionality needs to be taken into account but does not require a specific tool or additionality test to be used. These would be defined by the GHG programme or regulation under which ISO 14064 is used. ISO 14064 does not focus on co-benefits.

History of Standard

ISO 14064 was developed over several years by the International Organisation for Standardization (ISO). It was launched in the spring 2006.

Administrative Bodies

ISO (International Organisation for Standardization) is the world's largest developer and publisher of International Standards. ISO is a non-governmental organisation that forms a bridge between the public and private sectors. It is a network of the national standards institutes of 157 countries.

Financing of the Standard Organisation

ISO's national members pay subscriptions to cover the operational cost of ISO's Central Secretariat. The subscription paid by each member is in proportion to the country's Gross National Income and trade figures. Another source of revenue is the sale of standards. The cost for ISO 14064 is around € 85 for each of the three standards.

Recognition of Other Standards

Because ISO 14064 is an Offset Standard Protocols and not a full fledged offset standard it provides definitions and procedures to account for GHG reductions yet does not define eligibility criteria. ISO 14064 is therefore

intended to be used in conjunction with other regulations or standards. For example, the procedures for the VSC are based on ISO 14064.

ISO 14064 is intended to be programme-neutral and the requirements of the programme under which ISO is used take precedence to the ISO rules.

Number of Projects

N/A

2. Eligibility of Projects

Project Type

Not defined under ISO 14064.

Project Location

Not defined under ISO 14064.

Project Size

Not defined under ISO 14064.

Start Date

Not defined under ISO 14064.

Crediting Period

Not defined under ISO 14064.

Project Funding Source

Not defined under ISO 14064.

Project Funding Restriction

Not defined under ISO 14064

Environmental & Social Impacts

The requirements are listed in only general terms: an Environmental Impact Assessment (EIA) is required if the host country or region requires the completion of such an assessment.

ISO also specifies that relevant outcomes of stakeholder participation have to be presented.

3. Additionality and Baselines

Additionality Requirements

ISO 14064-2 contains no formal requirements for additionality determination but offers general guidelines. The guidelines for additionality tools generally assume a project-specific approach. However, since the requirements of a GHG programme take precedence over specific ISO 14064-2 requirements ISO 14064-2 allows performance standards to be used where this is prescribed by a GHG programme.

Baselines & Methodologies

ISO 14064-2 does not prescribe baseline procedures, but rather offers general requirements and guidance on how to determine a project baseline.

4. Validation & Registration

Process

ISO 14064-2 strongly recommends the use of third-party auditors but it is a requirement to do so only if the party wants to make its GHG claims public.

ISO 14064-3 defines the validation and verification process. "It specifies requirements for selecting GHG validators/verifiers, establishing the level of assurance, objectives, criteria and scope, determining the validation/verification approach, assessing GHG data, information, information systems and controls, evaluating GHG assertions and preparing validation/verification statements," (ISO-14064-3) Validation and verification requirements are stated together with few distinctions between the two.

Key Requirements

ISO 14064 does not require validation or verification. Such requirements are usually elements of a GHG programme. If a GHG project has not been linked to a specific GHG programme, the project proponent has to decide on the type of validation and/or verification (1st, 2nd or 3rd party verification) and the level of assurance (e.g. high or moderate) required against the GHG assertion. The GHG assertion is a statement on the performance of the GHG project usually made by the project proponent. ISO 14064-3 specifies principles and requirements for the validation and verification of GHG assertions. (ISO 14064-2)

5. Monitoring, Verification & Certification

Process

ISO defines criteria in general terms: Project proponents must establish the criteria and procedures for project monitoring, including selecting or establishing "criteria and procedures for selecting relevant GHG sources, sinks and reservoirs for either regular monitoring or estimation."

Author's Comments on ISO 14064

ISO 14064 can be used as a building block for a full-fledged offset standard. As such it is a useful tool and has been used by many regulatory and voluntary schemes.

In this paper we evaluate the overall quality of offset standards rather than protocols. It would therefore go beyond the scope of this paper to comment on the specifics of the ISO 14064.

Key Requirements

Project only have to be verified if they are reported publicly. Project proponents must identify and justify which GHG sources, sinks, and reservoirs will be monitored.

Monitoring procedures should include the following:

- a) *purpose of monitoring;*
- b) *types of data and information to be reported, including units of measurement;*
- c) *origin of the data;*
- d) *monitoring methodologies, including estimation, modelling, measurement or calculation approaches;*
- e) *monitoring times and periods, considering the needs of intended users;*
- f) *monitoring roles and responsibilities;*
- g) *GHG information management systems, including the location and retention of stored data.*

6. Evaluation of Auditors

ISO 14065 was released in 2007 and spells out the requirements for greenhouse gas validation and verification bodies for project accreditation and emissions reductions verifications.

ISO is currently developing ISO 14066 which will outline how individuals can get accredited auditors and how auditors will be reviewed.

It is not yet clear how ISO will supervise the work of its GHG project auditors.

7. Registries

Not applicable

8. Fees

The purchase cost of each of the three ISO standard manuals is around € 85.

8. Governmental Action to Regulate the Voluntary Market

Several governments have expressed concern about the lack of quality control in the voluntary market and are starting to explore possibilities to regulate the voluntary market.

United Kingdom

In early 2007, the UK's Department for Environment, Food and Rural Affairs (DEFRA) launched their consultation process for establishing a code of best practice for voluntary carbon offsetting. The code is meant to:

1. educate consumers about offsetting and its role in addressing climate change
2. enable consumers to make choices about offsetting
3. increase consumer confidence
4. show offset providers the quality and verification standards to which they should aspire

In February 2008 DEFRA released its code of best practice, initially limiting it to credits that have been certified and issued by the UN, such as CERs and ERUs. Although the code of practice currently excludes VERs, these might be included at a later point. Such VERs would have to prove that they are additional and permanent, avoid leakage, are verified, transparent and not double counted*.

Norway

In mid 2007, the government of Norway announced that it will set up a web-based system for consumers for purchasing and cancelling CER offsets. Starting in April 2008, Norway will allow private consumers, businesses and organizations to purchase and cancel UN-backed carbon credits from a government website, in an effort to ease concerns over the quality of offset credits.

United States

In July 2007, The US House of Representatives Select Committee on Energy Independence and Global Warming hosted a hearing on voluntary carbon offsets "to explore the issues of transparency, effectiveness and other necessary questions to ensure carbon offsets can be a responsible way to address global warming on a consumer-based level."†

France

The ADEME (Agence de l'Environnement et de la Maîtrise de l'Energie; www.ademe.fr), a public agency under the joint supervision of the Ministries for Environment and Education and Research, is currently developing a *Charter of Good Practice* for offset providers in France. The charter will standardize definitions and methodologies, and provide transparent and homogeneously rated information on offset projects in terms of their environmental and social impacts. Offset providers can sign on to the charter and agree to having their projects evaluated. ADEME will make its information available to the public via a website.‡

* <http://www.defra.gov.uk/environment/climatechange/uk/carbonoffset/codeofpractice.htm>, accessed on Feb 22, 2008

† http://www.house.gov/apps/list/press/global_warming/July18CarbonOffsets.shtml, accessed Nov 16, 2007

‡ Charte de bonnes pratiques des opérateurs de compensation volontaire, <http://ademe.fr>, accessed Nov 16 2007

9. Overall Standard Ratings & Conclusions

"For every complex problem, there is a solution that is simple, elegant, and wrong." (Henry Louis Mencken 1880–1956)

In order to preserve a high probability of keeping global temperature increase below 2 degrees Centigrade, current climate science suggests that atmospheric CO₂ concentrations need to peak below 450ppm. This requires global emissions to peak in the next decade and decline to roughly 80% below 1990 levels by the year 2050 (Baer and Mastrandrea, 2006). Such dramatic emissions reductions require a sharp move away from fossil fuel, significant improvements in energy efficiency and substantial reorganisation of our current economic system. This transition can only be achieved by far-reaching national and international climate policies.

Carbon offset markets have been promoted as an important part of the solution to the climate crisis because of their economic and environmental efficiency and their potential to deliver sustainability co-benefits through technology transfer and capacity building. The voluntary offset market in particular has been promoted for the following reasons:

Possibility of Broad Participation

The voluntary carbon market enables those in unregulated sectors or countries that have not ratified Kyoto, such as the US, to offset their emissions.

Preparation for Future Participation

The voluntary carbon market enables companies to gain experience with carbon inventories, emissions reductions and carbon markets. This may facilitate future participation in a regulated cap-and-trade system.

Innovation and Experimentation

Because the voluntary market is not subject to the same level of oversight, management, and regulation as the compliance market, project developers have greater flexibility to implement projects that might otherwise not be viable (e.g. projects that are too small or too disaggregated).

Corporate Goodwill

Corporations can benefit from the positive public relations associated with the voluntary reduction of emissions.

Most importantly, voluntary and compliance offset mechanisms have the potential to strengthen climate policies and address equity concerns:

Cost-effectiveness that allows for deeper caps or voluntary commitments.

By decreasing the costs of reductions, offsets can in principle make a compulsory mandate more politically feasible and a voluntary target more attractive, thereby accelerating the pace at which nations, companies, and individuals commit to reductions.

Higher overall reductions without compromising equity concerns.

One of the greatest challenges of climate protection is how to achieve the deep global emissions reductions required while also addressing the development needs of the poor. Historically, developed nations have been responsible for a much larger share of the increase in atmospheric GHG concentrations than developing countries. But to achieve climate stabilisation, emissions must be curbed in all countries, both rich and poor. Offsets may be one way out of the conundrum of needing to achieve steep global emissions reductions while at the same time allowing poor nations to develop. This has not been the case thus far because the emissions reductions undertaken have been too small to be significant. Small reduction targets allow participants to tinker at the margins and avoid the kind of restructuring that is needed to achieve climate stabilizations. While taking on considerable domestic emissions reductions, industrialized countries could, through offsets, help finance the transition to low-carbon economies in

developing nations. In other words, offsets might allow equity to be decoupled from efficiency, and thus enable a burden-sharing arrangement that involves wealthier countries facilitating mitigation efforts in poorer countries*.

Yet as experience with offset markets grows, their shortcomings have become more widely understood. The main points of criticism against carbon offsetting include:

Carbon Offsets May Stifle Action At Home

Carbon offsetting enables industrialized nations to avoid taking action domestically, corporations to continue inefficient and unsustainable production methods, and individuals to perpetuate unsustainable lifestyles. While the cost-effectiveness arguments for offset markets should not be dismissed, it is important to note that they are based on somewhat oversimplified interpretations of the required transition to a low-GHG economy.

It is true a tonne of carbon has the same impact on atmospheric GHG concentrations regardless of its source, and therefore “cheap” reductions are equivalent to “costly” reductions. However, different reductions have varying *long-term* impacts in terms of technological innovation, market transformation, and infrastructural transition. For example, a reduction that comes from fuel switching from oil to gas may be cheaper than a comparatively costly investment in a public transit system, but is much less effective at facilitating change in the long-term. The former may be based on entirely conventional technology and undone as soon as relative fuel price incentives reverse. By contrast, the latter may help to advance a relatively novel practice (e.g., hybrid bus rapid transit), curb sprawl by making a denser urban core more attractive, and demonstrate appealing alternatives to automobile dependence. For this reason, market mechanisms alone are not sufficient to address climate change, and complementary policies that prioritise a long-term transition to a low carbon economy are needed.

Unintended Negative Impact on Policies

Carbon markets can create barriers to future regulation of emissions sources. Those who benefit from the sale of carbon offsets may oppose regulation that would deny them that stream of revenue.

Additionality Difficult to Test

Additionality tests attempt to establish that an offset project would not have happened in a business-as-usual scenario. The major weakness of offset systems centered on project-based mitigation is that emission reductions have to be measured against a counterfactual reality. The emissions that would have occurred if the market for offsets did not exist must be estimated in order to calculate the quantity of emissions reductions that the project achieves. This hypothetical reality cannot be proven; instead, it must be inferred and thus its definition is always to some extent subjective. Unless the issue of additionality is addressed effectively, it is unclear to what extent offsets can make a useful contribution to climate protection.

Unbalanced Market Dynamics and Free Riders

Although offset markets are relatively straightforward in principle, they have been anything but straightforward to implement in practice. In part, this may be attributed to the inevitable birthing pains associated with creating institutions and stabilizing new markets. But problems also arise from inherent structural problems inherent in the conception of offset markets. Offset markets lack a critical competitive check found in well functioning markets, in which the interests of buyer and seller are naturally balanced against each other. In offset markets, both the seller *and* the buyer benefit from maximizing the number of offsets a project generates. This issue can partially be mitigated by imposing stringent requirements for auditors and an additional approval process through the standard organisation (see chapter 5.6).

* For an in-depth analysis of such a potential climate and equity framework, see the *Greenhouse Development Rights Framework* (Baer et al 2007)

Inherent Conflicts of Interest

To minimize the number of “free riders” most standards require third-part auditors to verify the emissions reductions. Yet auditors are chosen and paid by a project’s developer. There is thus pressure on the auditors to approve projects in order to preserve their business relationships with the project developers. This compromises the auditors’ independence and neutrality. To account for this dynamic, offset markets need an administrative infrastructure to ensure that auditors’ estimates of project reductions are reasonable. This has proven to be a much greater challenge than anticipated (Schneider, 2007 & Haya, 2007).

Lack of Development Benefits

Although carbon markets – and specifically the CDM – are intended to deliver development co-benefits for their host countries, these have not been widely realized. In practice, offset projects often rely on relatively conventional technologies, and rarely benefit poor communities with insufficient access to energy services.

Carbon offsetting is a complex and multifaceted process. No offset standard will ever be able to simultaneously maximize quality, minimize cost, and ensure large co-benefits for all its projects, because the design of offset systems inherently involves tradeoffs between these factors. The relative weight given to each of these considerations depends on the overall goals of each standard. Many standards for the voluntary offset market have only recently been developed. A full evaluation of how these standards perform in practice is thus not yet feasible. Yet, it is possible at this time to compare each standard’s approach to minimizing the weaknesses and maximizing the strengths of offset schemes. The following sections and table summarize the most relevant aspects of each standard.

General Standard Information

Main Supporters

‘Main Supporters’ lists the type of stakeholder associated with each standard. Each of the reviewed standards has been developed and is supported by different groups of stakeholders. The types of stakeholders reflect to some extent the goal of the standard. For example, environmental NGOs tend to be more concerned about credit quality and co-benefits, whereas private actors in the carbon markets tend to put more emphasis on simplifying procedures to minimize costs.

Market Share

Not all standards are equally influential. ‘Market Share’ indicates the size of each of the standards, and thus to some extent reflects the standard’s importance. With most standards, it is very difficult or impossible to get actual figures for the numbers of offsets sold. Some standards, such as the VCS 2007, were only recently released and do not yet have a history of transactions, so their market share is difficult to predict. This column therefore gives only a broad indication of the current and predicted market share of each standard.

Price of Offsets

‘Price of Offsets’ indicates the cost of one offset, representing the reduction of 1 tonne of CO₂e. Offset prices depend on many different parameters, such as the type of project, the location, market demand, stringency of the standard requirements, etc. The pricing given in this column indicates average prices for different projects (as of January 2008; see chapter 7). While it would be wrong to assume that low prices are necessarily an indication of lower quality offsets, it is true that very low priced carbon offsets are more likely to originate from projects that are non-additional. Since the revenue they produce is small, it is on average less likely that the offsets are vital to the project’s feasibility. Industrial gas projects, which are low-cost mitigation options, are an exception to this general rule. These projects point to a second aspect of very low priced offsets: they usually do not have high co-benefits.

Authors' Comments

The Author's comments state the perceived goal of each standard and any relevant information about the standard. More in-depth commentary and information about each standard can be found in chapter 7.

Offset Quality Control

Additionality Tests (relative to CDM)

The CDM additionality tool (see appendix B) most commonly used for testing the additionality of CDM projects was developed carefully over several years. In this column it is used as a reference against which the other standards' project-based additionality testing procedures are compared:

- + Requirements go beyond and are more stringent than CDM rules
- Requirements are less stringent than CDM
- = Requirements are the same or very similar to CDM
- N/A Not Applicable

Although the CDM additionality tool is well respected, it does not guarantee that only additional projects are approved. Recent reports have shown that despite the fact that the additionality tool is required for all CDM projects; it is likely that a significant number of non-additional projects are registered (Schneider, 2007; Haya 2007). Similar studies have not yet been carried out for VER projects. It is therefore impossible to know if VER standards likely have a higher or lower percentage of additional projects. It remains to be seen how well these standards will succeed in implementing their additionality requirements.

Some of the standards, such as the VCS and the VER+, plan to develop performance-based additionality tools (also called benchmark tools). By shifting the tasks of establishing a baseline from the project developer to the standard-setting organisation, benchmark tools could potentially increase transparency and decrease administrative burden for project developers. Yet such approaches also harbour the danger of certifying too many free riders. Benchmark rules will have to be closely examined to ensure that they minimize or mitigate the effects of non-additional offsets (see chapter 5.1)*.

Third-party Verification Required

To minimize the number of "free riders" most standards require third-part auditors to verify the emissions reductions.

Separation of Verification and Approval Process

Fundamental differences exist among standards as to how projects are reviewed and approved. Under the CDM, projects are verified by third-party auditors and then reviewed, approved or rejected by the CDM Executive Board. Most voluntary offset standards do not have such a body to review and approve the projects after the auditors have verified them. Projects are simply approved by the auditors themselves. The lack of a standard body which approves projects exacerbates conflicts of interest, particularly where auditors are selected and paid for by the project developer. None of the voluntary standards have specific procedures in place to review the approved auditors nor to allow for sanctions against or the discrediting of an under-performing auditor (see chapter 5.6).

Registry

Carbon offset registries keep track of offsets and are vital in minimizing the risk of double-counting, that is, having multiple stakeholders take credit for the same offset. Registries also clarify ownership of offsets (see chapter 5.7).

* Related to additionality are baseline calculations. The requirements for baselines methodologies are not included in this summary table but can be found in chapter 5.1.

Offset Project Information

Each standard accepts different types of offset projects. The CDM, for example accepts all projects that reduce the six GHGs listed in the Kyoto Protocol, with the exception of the protection of existing forests (REDD), nuclear energy, and HFC destruction from new facilities (see chapter 5.2).

Project Types

REDD = Reduced Emissions from Degradation and Deforestation

EE = Energy Efficiency

RE = Renewable Energy

LULUCF = Land Use, Land-Use Change and Forestry = Bio-Sequestration

Excludes Project Types with High Chance of Adverse Impacts

Some project types are more likely to have adverse social and environmental impacts. Some standards therefore exclude these projects types, such as tree plantations and monocultures which are detrimental to biodiversity and can negatively impact watersheds or large hydro projects, which can displace large numbers of people.

Sustainable Development

Co-benefits are social and environmental benefits that go beyond the GHG reduction benefits of offset projects. Such benefits include job creation, improved local air quality, protected and enhanced biodiversity, etc. The Clean Development Mechanism (CDM) was approved by developing nations specifically because offset projects were not only to provide cost-effective reductions for Annex 1 countries but also development benefits for the host countries. In other words, to qualify as a CDM project, the original intention was that a CDM project would have to deliver development benefits. In practice, the CDM has failed to consistently deliver such development and sustainability benefits (Holm Olsen, 2007; Sutter and Parreño, 2007; see chapter 5.5.)

Co-Benefits (relative to CDM)

Voluntary standards vary in their requirements for co-benefits. This column highlights the co-benefit requirements of each standard, comparing them to the requirements of the CDM.

Many of the voluntary carbon offset standards that have been developed in the last few years represent a step in the right direction. They help address some of the weaknesses in the current offsetting process and foster climate mitigation projects. The voluntary market in particular has helped to shape climate actions in countries that have thus far been reluctant to enact strong policies. Even with far reaching cap-and-trade policies expected to be enacted in the medium term, there will likely always be room for a voluntary market. The demand for voluntary offsets will come from private and corporate actors who wish to go beyond regulatory requirements and will be supplied by mitigation projects in sectors that are not capped. Well-designed standards will help the voluntary market mature and grow.

Main Supporters	Market Share	Additionality Tests (relative to CDM)	Third-party Verification Required	Separation of Verification and Approval Process	Registry	Project Types	Excludes Project Types with high chance of adverse impacts	Co-Benefits (relative to CDM)	Price of Offsets
Clean Development Mechanism									
UNFCCC Parties	large	=	yes	yes	yes	All minus REDD, new HFC, nuclear	no	=	€14–30
Authors' Comments:	The CDM is part of the Kyoto protocol and aims to create economic efficiency while also delivering development co-benefits for poorer nations. It has been successful in generating large numbers of offsets. Whether it also has delivered the promised development co-benefits is questionable.								
Gold Standard									
Environmental NGOs (e.g. WWF)	small but growing	=/+ ¹	yes	yes	Planned	EE, RE only	yes	+	VERs: €10–20 CERs: up to €10 premium
Authors' Comments:	The GS aims to enhance the quality of carbon offsets and increase their co-benefits by improving and expanding on the CDM processes. ¹ For large scale projects the GS requirements are the same as for CDM. Yet unlike CDM, the GS also requires the CDM additionality tool also for small-scale projects.								
Voluntary Carbon Standard 2007 (VCS 2007)									
Carbon Market Actors (e.g. IETA)	new; likely to be large	= ²	yes	no	Planned	All minus new HFC	no	-	€5–15 ³
Authors' Comments:	The VCS aims to be a universal, base-quality standard with reduced administrative burden and costs. ² The VCS plans to develop performance based additionality tests. These tools have not yet been developed and are thus not included in this rating. ³ Prices are for projects implemented under VCS ver. 1.								
VER+									
Carbon Market Actors (e.g. TÜV SÜD)	small but growing	=	yes	no	yes	CDM minus large hydro	yes	-	€5–15
Authors' Comments:	VER+ offers a similar approach to CDM for project developers already familiar with CDM procedures for projects types that fall outside of the scope of CDM.								
Chicago Climate Exchange (CCX)									
CCX Members and Carbon Market Actors	large in the US	-	yes	yes	yes	All	no	-	€1.2–3.1 ⁴
Authors' Comments:	CCX was a pioneer in establishing a US carbon market. Its offset standard is part of its cap-and-trade programme. ⁴ Sales in USD: \$1.8-4.5 per metric tonne (October 07-February 08)								
Voluntary Offset Standard (VOS)									
Financial Industry and Carbon Market Actors	N/A	=	yes	no	Planned	CDM minus large hydro	yes	=	N/A
Authors' Comments:	VOS closely follows CDM requirements and aims to decrease risks for offset buyers in the voluntary market.								
Climate, Community and Biodiversity Standards (CCBS)									
Environmental NGOs (e.g. Nature Conservancy) and large corporations	large for LULUCF	=	yes ⁵	no	N/A	LULUCF	yes	+	€5–10
Authors' Comments:	The CCBS aims to support sustainable development and conserve biodiversity. ⁵ The CCBS is a Project Design Standard only and does not verify quantified emissions reductions.								
Plan Vivo									
Environmental and social NGOs	very small	=	no	no	yes ⁶	LULUCF	yes	+	€2.5–9.5
Authors' Comments:	Plan Vivo aims to provide sustainable rural livelihoods through carbon finance. ⁶ It verifies and sells ex-ante credits only. Third party verification is not required but recommended.								

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Appendix A: Renewable Energy Certificates (RECs)

Are RECs equivalent to or fungible with emission offsets?*

Renewable Energy Certificates (RECs) are an environmental commodity created to provide economic incentive for electricity generation from renewable energy sources. Commonly, a REC is referred to as representing the environmental benefits attributed to one megawatt hour of electricity generated from a renewable energy resource. Yet the definitions of RECs as an environmental commodity are vague at best[†]. It might therefore be more correct to define a REC as “Representing the exclusive proof that one MWh of electricity was generated from an eligible renewable energy resource.” (Gillenwater, 2007) Typically, RECs are sold separately from the electricity that is generated.

Regulated and voluntary REC markets exist in the United States, Europe and Australia. Both of these markets are growing rapidly. Voluntary markets are driven by large buyers such as corporations and institutional customers. In the US, renewable energy sales in voluntary markets have grown at rates ranging from 40% to 60% annually for the past several years. Collectively, the compliance and voluntary renewable energy markets made up an estimated 1.7% of total U.S. electric power sales in 2006. (Bird, 2007)

In the voluntary carbon offset market, RECs are increasingly being converted to and sold as carbon-offset equivalents. RECs and other renewable energy projects accounted for 33% of the voluntary carbon market and over half of those originated as RECs (Ecosystem Marketplace). Converted RECs, while often considerably cheaper than other offsets are highly controversial. To understand why, it is especially important to examine **additionality** and **ownership** issues.

Additionality

RECs are designed primarily to track renewable energy production. In the United States, for example, many states have established Renewable Portfolio Standards (RPSs)[‡]. These standards require utilities to produce a certain percentage of their electricity with renewables. Utility companies can either choose to build new renewable facilities or buy RECs from other utilities who have more than met their requirement. Under an RPS, RECs function the same way allowances function in an emissions Cap-and-trade system. The lower the emissions cap, the more emissions reductions will be needed; the higher the RPS requirement is, the more renewable energy will have to be produced. In other words, in a quota system, additionality is not necessary for environmental integrity. Because of that RECs that are used in a quota system do not have to be tested for additionality. In the voluntary markets, RECs do not function under a quota and therefore have to be additional in order to fulfill their purpose of compensating for other emissions (see section on Additionality XXX)

Some certified RECs are tested for additionality. Yet these additionality tests are usually quite minimal: The *regulatory test* typically states that the same renewable generation must not be counted toward RPS compliance. The *technology test confirms* that electricity is generated from an eligible renewable energy technology (e.g. wind, solar, or geothermal). The *start date test* sets the earliest acceptable start date of a project (e.g. 1996). Projects that were built before the set start date are not eligible to produce RECs. To define RECs that have passed these three tests as additional, implies that all renewable energy generation capacity outside an RPS and built after 1996 were built because of the revenue they are generating from REC sales into the voluntary market.

* Much of this section was informed by Gillenwater, 2007. His two papers offer an in-depth analysis of how RECs function in emissions markets.

† Many US states have not fully defined a REC or specified which environmental attributes must remain with renewable energy transactions for those transactions to count towards RPS compliance. For more information see Holt, 2007

‡ “As of the end of 2006, twenty-one [US] states and the District of Columbia had mandated RPSs in the United States. However, only eighteen of these states allowed the use of tradable RECs”. (Gillenwater, 2007, p.4)

If RECs are converted to carbon offsets without any strict additionality testing, RECs will tend to come from cheaper business-as-usual (BAU) projects (which by definition are economic without additional REC incentives). These BAU projects will thus tend to dominate the market. Truly additional projects will not be able to compete because they face additional costs or barriers. In conclusion, the sale of non-additional RECs in voluntary market can potentially hamper truly additional projects and lead to increases in emissions.

However, these tests may not provide a complete picture of whether a renewable project would have otherwise occurred, and in particular, the role that offset revenue might play in making a renewable energy project happen. To do this, the REC and RPS markets alone do not tell the full story. Many national and sub-national programs offer financial incentives for renewable energy projects (e.g. production tax credits, state/local tax incentives, and/or guaranteed feed-in or net metering tariffs) that may play an even more important role in funding renewable projects than REC (or offset) revenue. In other words, if the presumption is that a retired REC should count as an offset, the threshold question is whether REC revenue was sufficient to make a project “happen”. The very fact that RECs trade for as little as 0.1c/kWh in some parts of the US (equivalent to perhaps USD 1-2/tCO₂), and that production tax credits are worth about 1.8c/kWh in the US, casts some doubt*. Also, renewable electricity plants operate with very low variable operating costs because unlike fossil fuel plants, they do not incur fuel costs. Therefore, the additionality of RECs must be determined during the project design phase, not the operation phase. Projects shown to have been started with the expectation and need for REC revenues are likely to be additional.

Ownership

Offsets in general and RECs in particular face challenges about who has the right to claim ownership of a particular emission reduction. Establishing ownership of offset reductions from renewable energy projects is especially difficult. For example, if a wind farm is built, the emissions reductions could potentially be claimed by: the utility, the state the wind farm is located in, or the end-user of the electricity. Few policies are in place to prevent two parties from selling the same reduction or to prevent a single party from selling a reduction to multiple buyers. (see section on double counting XXX) This lack of clear ownership is exacerbated with RECs, the attributes of which are often defined in general and ambiguous terms, which makes assigning ownership more difficult. The lack of a consistent REC definition in the voluntary and the compliance REC markets prevents RECs from functioning as a homogeneous environmental commodity (Gillenwater, 2007).

RECs as Carbon Offsets

Because of the issues discussed above, the retirement of RECs does not automatically provide a solid basis for a GHG offsets. To do so, the following conditions should be met:

- The RECs originate from an RPS compliance market, with adequately ambitious RPS targets and the likelihood of strict enforcement (i.e. they create true scarcity)
- The attributes of RECs are clearly and unambiguously defined,
- Ownership issues have been resolved (e.g. through a registry)

If these conditions are met, then voluntarily buying and retiring RECs from a RPS compliance market could be an effective tactic to ensure genuine emissions reductions. Buying such RECs reduces their supply, leading to the implementation of more renewable energy projects to meet RPS targets.

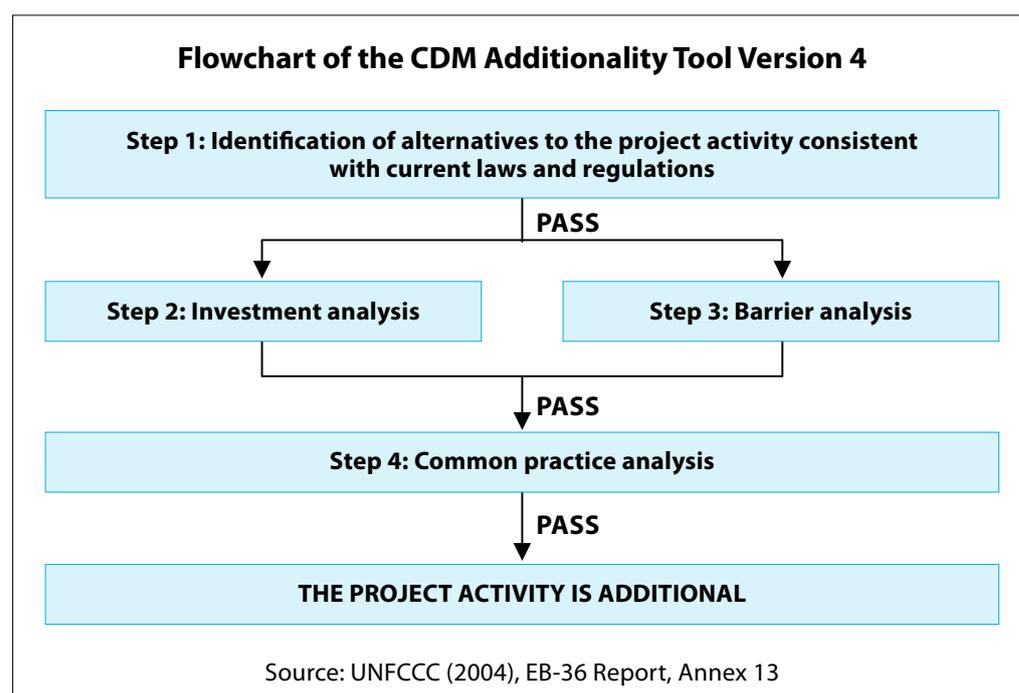
* The following is an excerpt from a BusinessWeek article:

The trouble stems from the basic economics of RECs. Credits purchased at \$2 a megawatt hour, the price Aspen Skiing and many other corporations pay, logically can't have much effect. Wind developers receive about \$51 per megawatt hour for the electricity they sell to utilities. They get another \$20 in federal tax breaks, and the equivalent of up to \$20 more in accelerated depreciation of their capital equipment. Even many wind-power developers that stand to profit from RECs concede that producers making \$91 a megawatt hour aren't going to expand production for another \$2. "At this price, they're not very meaningful for the developer," says John Calaway, chief development officer for U.S. wind power at Babcock & Brown, an investment bank that funds new wind projects. "It doesn't support building something that wouldn't otherwise be built." (Ben Elgin, Little Green Lies, October 29, 2007, BusinessWeek)

Yet a more fundamental issue remains: If a sector that currently generates voluntary RECs and VERs becomes part of a regulated market with its own emissions cap, voluntary offsets based on RECs may no longer be valid*. For example, a region's electric sector is capped, with allowances distributed to generators or retail electricity providers. If renewable energy projects in this region are reducing emissions from these capped sources, allowances are freed up. If these projects (e.g. via their RECs) claim offsets as well, this would lead to double counting for the same emission reductions. It is possible to avoid these double counting issues by designing a cap-and-trade system that enables offsets within capped sectors (by setting aside a fixed amount of allowances for up to that amount of offsets), but that has yet to occur in the GHG cap-and-trade systems implemented to date (EU ETS and RGGI).

* The voluntary market could also potentially create barriers to future regulation of sources. If a sector that currently generates voluntary RECs and VERs becomes part of a regulated market, that sector can no longer sell those voluntary RECs and VERs. Those who benefit from the current sales might therefore oppose regulation that would remove that stream of revenue from them.

Appendix B: CDM Additionality Tool



Step 1: Identifying realistic and credible alternatives to the proposed project activity that are compliant with current laws and regulations

Compliance with existing laws and regulations is mandatory even if they are unrelated to GHG emissions. If the proposed project activity is not compliant with existing laws and regulations, then the project developer must demonstrate that the applicable laws and regulations are not systematically enforced, and that widespread non-compliance is prevalent. If this step is satisfied, then project developers need to satisfy either the investment analysis test (step 2) or the barrier analysis test (step 3), or both, before moving to demonstrate that the proposed project is not commonly practiced (step 4).

Step 2: Investment analysis to determine that the proposed project activity is not the most economically or financially attractive

If the proposed project produces no economic benefits other than CDM revenues, a simple cost method can be used to demonstrate that the project is not financially attractive without the CDM revenues. However, if the project does generate revenues other than CDM revenues, then an investment comparison analysis or a benchmark analysis using appropriate financial indicators should be applied. The financial analysis must also include a sensitivity analysis to show that the conclusion the financial attractiveness of the project is robust to reasonable variations in the critical assumptions.

If the analysis results in at least one of the alternatives being more financially attractive than the proposed project activity, then it would have satisfied the investment analysis test and the project developer can move directly to satisfy step 4 (common practice analysis). But if the project does not satisfy step 2, then the project developer needs to first fulfil step 3 before moving to step 4.

Step 3: Analysis of barriers that prevent the implementation of the proposed project activity or do not prevent the implementation of one of the other alternatives

In undertaking the barrier analysis test, project developers must assess barriers other than the financial barriers discussed in step 2. Such barriers may include investment barriers like the non-availability of private capital or technological barriers like the non-availability of skilled labour or higher technological risks under local conditions. To satisfy the barrier analysis test the project developer must demonstrate that the barrier identified prevents the implementation of the proposed project and does not prevent the implementation of the one of the identified alternatives. If this condition is satisfied, then the project developer can move directly to satisfy step 4. But if it is not satisfied, then the project developer must satisfy step 2 before moving to step 4.

Step 4: Analyze whether the proposed project activity is 'commonly practiced' by assessing the extent of diffusion of the proposed project activity

After demonstrating step 1 and either step 2, 3 or both, the project developer must demonstrate that the proposed project activity is not commonly practiced in the specified region. This is done by discussing other similar activities to the proposed project either to prove that no similar activities can be observed. If they are observed, then the essential distinctions between the proposed project and the observed similar projects must be explained. This step reinforces and complements claims made under the investment and/or barrier analyses. The satisfaction of this step means that the project is additional.

Appendix C: **Realized CDM Emissions Reductions**

Realized CDM Emissions Reductions By Project Category

CDM project with CERs issued (November 2007)

Type	Number of Projects	Issued kCERs	Issuance success
Agriculture	29	2019	49%
Biogas	3	274	87%
Biomass Energy	76	7328	90%
Energy Efficiency	26	6969	63–103%
HFCs	11	41570	93%
Hydro	44	3175	88%
Landfill gas	12	2301	35%
N₂O	4	17504	119%
Transport	1	59	51%
Wind	37	2257	74%
Total	259	85850	90%

For current and complete statistics, please see UNEP RISOE:

<http://cdmpipeline.org/publications/CDMpipeline.xls>

Appendix D: Glossary

Additionality: The principle that only those projects that would not have happened anyway should be counted for carbon credits.

Afforestation: The process of establishing and growing forests on bare or cultivated land, which has not been forested in recent history.

Annex 1 Countries: The 36 industrialized countries and economies in transition listed in Annex 1 of the UNFCCC. Their responsibilities under the Convention are various, and include a non-binding commitment to reducing their GHG emissions to 1990 levels by the year 2000.

Annex B Countries: The 39 emissions-capped industrialised countries and economies in transition listed in Annex B of the Kyoto Protocol. Legally-binding emission reduction obligations for Annex B countries range from an 8% decrease to a 10% increase on 1990 levels by the first commitment period of the Protocol, 2008–2012.

Assigned Amount Unit (AAU): A tradable unit, equivalent to one metric tonne of CO₂ emissions, based on an Annex 1 country's assigned carbon emissions goal under the Kyoto Protocol. AAUs are used to quantify emissions reductions for the purpose of buying and selling credits between Annex 1 countries.

Baseline scenario: A scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases (GHG) that would occur in the absence of the proposed project activity.

Baseline-and-credit system: More credits are generated with each new project implemented. Projects that are implemented outside of a cap-and-trade system.

Cancellation see Retirement

Cap-and-Trade: A Cap and Trade system involves trading of emission allowances, where the total allowance is strictly limited or 'capped'. Trading occurs when an entity has excess allowances, either through actions taken or improvements made, and sells them to an entity requiring allowances because of growth in emissions or an inability to make cost-effective reductions

Carbon Dioxide (CO₂): This greenhouse gas is the largest contributor to man-made climate change. Emitted from fossil fuel burning and deforestation

Carbon Dioxide Equivalent (CO₂e): A measure of the global warming potential of a particular greenhouse gas compared to that of carbon dioxide. One unit of a gas with a CO₂e rating of 21, for example, would have the warming effect of 21 units of carbon dioxide emissions (over a time frame of 100 years).

Certification: Certification is the written assurance by a third party that, during a specified time period, a project activity achieved the reductions in anthropogenic emissions by sources of greenhouse gases (GHG) as verified.

Certified Emissions Reductions (CERs): Tradable units issued by the UN through the Clean Development Mechanism for emission reduction projects in developing countries. Each CER represents one metric tonne of carbon emissions reduction. CERs can be used by Annex 1 countries to meet their emissions goals under the Kyoto Protocol.

Clean Development Mechanism (CDM): A provision of the Kyoto Protocol that allows developed countries (Annex 1) to offset their emissions by funding emissions-reduction projects in developing countries (non-Annex 1).

Compliance Market: The market for carbon credits (specifically CERs, EUAs, AAUs, and ERUs) used to reach emissions targets under the Kyoto Protocol or the EU ETS. Also called the Regulated Market.

Conference of Parties (COP): The meeting of parties to the United Nations Framework Convention on Climate Change.

Crediting Period: The period a mitigation project can generate offsets.

Designated Operational Entity (DOE): An independent entity, accredited by the CDM Executive Board, which validates CDM project activities, and verifies and certifies emission reductions generated by such projects.

Double-Counting: Double counting occurs when a carbon emissions reduction is counted toward multiple offsetting goals or targets (voluntary or regulated). An example would be if an energy efficiency project sold voluntarily credits to business owners, and the same project was counted toward meeting a national emissions reduction target.

Emission Reductions (ERs): The measurable reduction of release of greenhouse gases into the atmosphere from a specified activity or over a specified area, and a specified period of time.

Emission Reduction Units (ERUs): A tradable unit, equivalent to one metric tonne of CO₂ emissions, generated by a Joint Implementation project and used to quantify emissions reductions for the purpose of buying and selling credits between Annex 1 countries under the Kyoto Protocol.

Emissions Trading: A provision of the Kyoto Protocol that allows Annex 1 countries to trade emissions reduction credits in order to comply with their Kyoto-assigned targets. This system allows countries to pay and take credit for emissions reduction projects in developing countries where the cost of these projects may be lower, thus ensuring that overall emissions are lessened in the most cost-effective manner.

Environmental Integrity: Is used to express the fact that offsets need to be real, not double counted and additional in order to deliver the desired GHG benefits. The term should not be confused with “secondary environmental benefits” which is used for the added benefits an offset projects can have (e.g. air pollution reduction and protection of biodiversity.)

European Union Allowance (EUA): Tradable emission credits from the European Union Emissions Trading Scheme. Each allowance carries the right to emit one tonne of carbon dioxide.

European Union Emissions Trading Scheme (EU ETS): The EU ETS is a greenhouse gas emissions trading scheme which aims to limit emissions by imposing progressively lower limits on power plants and other sources of greenhouse gases. The scheme consists of two phases: Phase I (2005-07) and Phase II (2008-12).

Ex-ante: In terms of carbon offsets, ex-ante refers to reductions that are planned or forecasted but have not yet been achieved. The exact quantities of the reductions are therefore uncertain.

Ex-post: As opposed to ex-ante offsets, ex-post reductions have already occurred and their quantities are certain.

Forward Crediting: Sale of ex-ante credits. At contract closure the buyer pays for and receives a certain number of offsets for emissions reductions or sequestration that will occur in the future.

Forward Delivery: At contract closure the buyer pays the purchase price for a certain number of offsets that have yet to be produced. The offsets will be delivered to the buyer once they have been realized and verified.

Greenhouse Gases (GHGs): Gases that cause climate change. The GHGs covered under the Kyoto Protocol are: CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆

Host Country: The country where an emission reduction project is physically located.

Internal rate of return (IRR): The annual return that would make the present value of future cash flows from an investment (including its residual market value) equal the current market price of the investment. In other words, the discount rate at which an investment has zero net present value.

Issuance: Issuing a specified quantity of CERs for a project activity into the pending account of the CDM EB into the CDM registry.

Joint Implementation (JI): A provision of the Kyoto Protocol that allows those in Annex 1 (developed) countries to undertake projects in other Annex 1 (developed or transitional) countries (as opposed to those undertaken in non-Annex 1 countries through the CDM).

Kyoto Mechanisms: The three flexibility mechanisms that may be used by Annex I Parties to the Kyoto Protocol to fulfil their commitments through emissions trading (Art. 17). Those are the Joint Implementation (JI, Art. 6), Clean Development Mechanism (CDM, Art. 12) and trading of Assigned Amount Units (AAUs).

Kyoto Protocol: An international treaty that requires participating countries to reduce their emissions by 5 percent below 1990 levels by 2012. The Protocol, developed in 1997, is administered by the Secretariat of the UN Framework Convention on Climate Change.

Leakage: Leakage is defined as the net change of anthropogenic emissions by sources of greenhouse gases (GHG) which occurs outside the project boundary, and which is measurable and attributable to the project activity.

LULUCF: Land use, land use change and forestry. The term given to tree-planting projects, reforestation and afforestation, designed to remove carbon from the atmosphere.

Millennium Development Goals (MDGs): The MDGs commit the international community to an expanded vision of development, one that vigorously promotes human development as the key to sustaining social and economic progress in all countries, and recognises the importance of creating a global partnership for development. The goals have been commonly accepted as a framework for measuring development progress.

Non-Annex 1 Countries: A group of mostly developing countries which have not been assigned emissions targets under the Kyoto Protocol and which are recognised by the UNFCCC as being especially vulnerable to the effects of climate change.

Offset Company: A company whose primary purpose is to create or sell offsets, either directly to consumers or through another organisation that wish to offer offsets to their clients.

Offset Provider: Offset providers include both offset companies and other businesses that utilize the services of offset companies to provide offsets to their clients.

Pre-registered Emission Reductions (pre-CERs): A unit of greenhouse gas emission reductions that has been verified by an independent auditor but that has not yet undergone the procedures and may not yet have met the requirements for registration, verification, certification and issuance of CERs (in the case of the CDM) or ERUs (in the case of JI) under the Kyoto Protocol. Buyers of VERs assume all carbon-specific policy and regulatory risks (i.e. the risk that the VERs are not ultimately registered as CERs or ERUs). Buyers therefore tend to pay a discounted price for VERs, which takes the inherent regulatory risks into account.

Primary market: The exchange of emission reductions, offsets, or allowances between buyer and seller where the seller is the originator of the supply and where the product has not been traded more than once.

Project-based system see Baseline-and-credit system

Project boundary: The project boundary shall encompass all anthropogenic emissions by sources of greenhouse gases (GHG) under the control of the project participants that are significant and reasonably attributable to the project activity.

Project Design Document (PDD): A project specific document required under the CDM rules which will enable the Operational Entity to determine whether the project (i) has been approved by the parties involved in a project, (ii) would result in reductions of greenhouse gas emissions that are additional, (iii) has an appropriate baseline and monitoring plan.

Prompt Delivery: At contract closure the buyer pays the purchase price for a certain number of offsets which have already been realized and are delivered to the buyer promptly.

Renewable Energy Certificates (RECs): A Renewable Energy Certificate represents a unit of electricity generated from renewable energy with low net greenhouse gas emissions. One REC represents 1 megawatt-hour.

Reforestation: This process increases the capacity of the land to sequester carbon by replanting forest biomass in areas where forests have been previously harvested.

Registration: The formal acceptance by the CDM Executive Board of a validated project as a CDM project activity.

Retirement: Retirement is a way of reducing overall emissions by purchasing carbon offsets and retiring them so that they may not be used to offset others' emissions. Retired credits can no longer be traded.

Secondary Market: The exchange of emission reductions, offsets, or allowances between buyer and seller where the seller is not the originator of the supply and represents a secondary trade in the particular product.

Stakeholders: Stakeholders mean the public, including individuals, groups or communities affected, or likely to be affected, by the proposed project activity or actions leading to the implementation of such an activity.

Temporary certified emission reductions (tCERs): A temporary certified emission reduction or tCER is a unit issued pursuant to Article 12 of the Kyoto Protocol for an Aforestation/Reforestation CDM project activity under the CDM, which expires at the end of the commitment period following the one during which it was issued. It is equal to one metric tonne of carbon dioxide equivalent.

United Nations Framework Convention on Climate Change (UNFCCC): An international treaty, developed at the 1992 UN Conference on Environment and Development, which aims to combat climate change by reducing global greenhouse gas emissions. The original treaty was considered legally non-binding, but made provisions for future protocols, such as the Kyoto Protocol, to set mandatory emissions limits.

Validation: The assessment of a project's Project Design Document, which describes its design, including its baseline and monitoring plan, by an independent third party, before the implementation of the project against the requirements of a specific standard.

Verification: Provides an independent third party assessment of the expected or actual emission reductions of a particular abatement project

Verified or Voluntary Emissions Reductions (VERs): Reductions that, unlike CERs, are sold on the voluntary market. VERs are linked neither to the Kyoto Protocol nor to the EU ETS. VERs are sometimes referred to as Voluntary Emissions Reductions.

Voluntary Market: The non-regulated market for carbon credits (especially VERs) that operates independently from Kyoto and the EU ETS. Also called the Non-Regulated Market.

Voluntary Offsetting: Offsetting purchases made by individuals, businesses, and institutions that are not legally mandated.