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A Review of Offset Programs: Trading Systems, Funds, Protocols, Standards and Retailers

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LIST OF ACRONYMS

AAU	Assigned Amount Unit (Kyoto Protocol)
ACP	Abatement Certificate Providers
ACT	Australian Capital Territory
AIE	Accredited Independent Entity
BER	Baseline Emission Rate
CCAR	California Climate Action Registry
CCEMA	Climate Change and Emissions Management Act
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reduction
tCER	temporary CERs
lCER	long-term CERs
CFI	Carbon Financial Instrument
CFL	Compact Fluorescent Lamp
CHF	Swiss Franc
CMAC	Climate Marketers Advisory Committee
CRS	Center for Resources Solutions
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COUP	Intertribal Council on Utility Policy
DFP	Designated Focal Point
DOE	Designated Operational Entity
DNA	Designated National Authority
EIA	Environmental Impact Assessment
EIT	Economy in Transition (e.g. Eastern Europe)
ERU	Emission Reduction Unit
EUA	EU ETS allowance
EU ETS	European Union Emissions Trading System
EPA	US Environmental Protection Agency
ERPA	Emissions Reduction Purchase Agreement
FPO	Forward Purchasing of Offsets
GHG	Greenhouse Gas
Green-e CPRE	Green-e Climate Protocol for Renewable Energy
GS	Gold Standard
GS TAC	Gold Standard Technical Advisory Committee
GWh	Gigawatt hour
GWP	Global warming potential
IETA	International Emissions Trading Association
ICRD	Independent Competition and Regulatory Commission
INCIS	International Carbon Investors and Services
IPART	Independent Pricing and Regulatory Tribunal
IRP	Integrated Resource Planning
ITL	International Transaction Log

JI	Joint Implementation
JISC	JI Supervisory Committee
LDC	Least Developed Countries
LULUCF	Land use, land-use change and forestry
MW	Megawatt
$MmtCO_2e$	Million metric tons of CO_2 equivalent
$MstCO_2e$	Million short tons of CO_2 equivalent
NEM	National Electricity Market
NSW GGAS	New South Wales Greenhouse Gas Abatement Scheme
NGAC	NSW GHG Abatement Certificates
ODS	Ozone Depleting Substance
PDD	Project Design Document
PSEG	Public Service Enterprise Group
PV	Photovoltaic
REC	Renewable Energy Credit
RGGI	Regional Greenhouse Gas Initiative
RMU	Removal Unit
RPS	Renewable Portfolio Standard
SF_6	Sulfur Hexafluoride
SSCWG	Small Scale Working Group
STI	Sustainable Travel International
TCG	The Climate Group
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCS AFOLU	VCS Agriculture, Forestry and Other Land Use
VCU	Voluntary Carbon Unit
VOS	Voluntary Offset Standard
VER	Verified Emission Reduction
VERR	Verified Emission Reduction/Removal
WBCSD	World Business Council for Sustainable Development
WEF	World Economic Forum Global Greenhouse Register
WCI	Western Climate Initiative
WRI	World Resources Institute

1 CONTEXT AND PURPOSE OF THIS REVIEW

Carbon or greenhouse gas (GHG) offsets have long been promoted as an important element of a comprehensive climate policy approach. By virtue of enabling emission reductions to occur where costs may be lower, offset projects and programs can reduce the overall cost of achieving a given emission goal, a finding supported by many economic analyses.[1] Furthermore, offsets have the potential to deliver sustainability co-benefits, spurred through technology development and transfer, and to develop human and institutional capacity for reducing emissions in sectors and locations not included in a cap and trade or a mandatory government policy.

With increasing attention on tackling the challenge of climate change, it is no surprise that interest in carbon offsets is blossoming. Increasingly, individuals, organizations, and policymakers are considering carbon offsets to be a key element in their strategies to address GHG emissions.

As experience with offset markets grows, however, a number of risks have become more widely apparent and caught the attention of the mainstream media.[2] Most fundamentally, offsets can pose a risk to the environmental integrity of climate actions, especially if issues surrounding additionality, permanence, leakage, quantification and verification are not adequately addressed. Depending on how offsets are used, they may delay investment and innovation in lower-emitting technologies in key sources and sectors of the economy (e.g. those covered by a cap and trade). They may provide desirable near-term cost advantages, but at the risk of "locking-in" higher emissions infrastructures and higher costs in the longer term. Where the cost of implementing offset projects is significantly lower than the market price of offsets, as is the case for many non-carbon dioxide (CO_2) types of project (e.g. HCFC destruction projects), offsets may be a more costly way than other mechanisms, such as direct incentives or regulation, of achieving the same reductions.

The challenge for policymakers is clear: to design offset programs and policies that can maximize their potential benefits while minimizing their potential downside risks. Given the number and complexity of offset issues and interactions, this challenge is considerable.

A logical place to start is by reviewing experience with existing offset programs. Apart from a few reviews of the voluntary carbon market (Hamilton, 2006; Trexler, 2007; Kollmuss *et al*., 2008), there is a general lack of publicly available reports that compile and compare the key features of the broad array of mandatory and voluntary offset programs. Much of the available literature on offsets focuses on individual programs or on specific aspects of the offset market, such as economic impacts, accounting

1 See e.g., EPA, 2008. "Analysis of Senate Bill S.2191 in the 110th Congress, the Lieberman-Warner Climate Security Act of 2008", http://www.epa.gov/climatechange/downloads/s2191_EPA_Analysis.pdf.

2 Gerald Wynn, "Buyer Beware: Carbon Cuts not Always Real." *Reuters*, May 2 2007; and Ben Elgin, "Another Inconvenient Truth." *Business Week*. March 26 2007.

Note to readers

As you review the material in this report, bear in mind that:

- **Reference citations are provided in two locations**. Each program review includes a reference section, which includes program-specific references, program websites and details of personal communications. Published documents that are cited throughout the report are included in the reference list at the end of the document.
- **Program reviews are organized by program type.** However, the order of program reviews within each program type (e.g. Mandatory Cap and Trade Systems) has no implications.
- **Some program reviews contain more limited discussion of the lessons learned.** It is our aim to provide a consistent level of detail and information across all program reviews; however, this is challenged by the imbalance in the published literature in favor of a select number of offset programs as well as the fact that experience and attention is concentrated in a handful of programs. This is especially the case for the Clean Development Mechanism (CDM), which as the most mature and dominant offset program operating in the carbon market has been reviewed by many more publications than any other program. This is reflected in the CDM program review in this report, which has a more in-depth lessons learned section than exists for any of the other programs.
- **Project portfolio data is limited.** In this version, information on the types and volume of projects approved or in the project pipeline is presented only for the CDM, Joint Implementation (JI) and the New South Wales Greenhouse Gas Reduction Scheme (NSW GGAS) programs. In future drafts, where information is available, we plan to provide similar tables in each program review.

protocols and co-benefits.[3] Numerous leading actors in offset markets interviewed for this report concurred that such a general review or resource is both currently lacking and much needed. To fill this gap, we have designed a systematic and ongoing review of domestic and international offset programs. Our intended audience includes parties interested and involved in the development of mandatory compliance systems and of voluntary offset programs and standards. The goal of this review is to provide an up-to-date analysis and synthesis of the most influential offset programs and activities, to reflect on lessons learned, and thus to inform participants and designers of current and future offset programs. Our intention is to periodically update this review to stay abreast of ongoing developments, and to develop a website portal to make this information more accessible.

3 The World Bank's annual *State of the Carbon Market* series (Capoor and Ambrosi, 2008) provides an excellent, albeit summary, review of the broad trends and figures in the carbon market generally, and the offsets market specifically. Some proprietary publications, such as Point Carbon, provide ongoing assessments of offset market activities.

Future versions of this review may also aim to report more extensively on lessons learned and on the perceived strengths and weaknesses of offset program designs. They may also include a wider array of offset programs and activities. This initial version targets programs that meet one or more of the following criteria:

- a significant volume of credit transactions occurring or anticipated;
- an established set of rules or protocols; and
- path-breaking, novel or otherwise notable initiatives or important lessons learned.

Comments and suggestions on this review, as well as on directions for potential future versions, are encouraged and should be directed to: offsetsreview@sei-us.org.

2 RECENT TRENDS

The landscape of domestic and international project-based emission reduction or "offset" programs is evolving rapidly. In 2007, the value of transactions in the global market for primary project-based emission reductions grew by 34% over 2006 levels to USD 8.2 billion (Capoor and Ambrosi, 2008). The market continues to be dominated by the main offset mechanisms of the Kyoto Protocol: the Clean Development Mechanism (CDM) and Joint Implementation (JI) . In 2007, the CDM accounted for 87% of project-based transaction volumes and JI transactions doubled in volume and tripled in value over 2006 levels. European and Japanese entities were the major buyers. The remaining market activity was split among other compliance mechanisms and voluntary purchases (Capoor and Ambrosi, 2008). While these programs and players are likely to continue to dominate the global offset market for some time, recent developments suggest that this pattern may be starting to shift, particularly in North America.

In July 2007, Alberta launched an offset system for its regulated large greenhouse gas (GHG) emitters, and in March 2008 the Canadian government launched its design for a federal offset program. In the US, at least three states (Oregon, Washington and Massachusetts) have adopted power plant carbon dioxide (CO_2) emission requirements that allow compliance through offsets.

The eastern states' Regional Greenhouse Gas Initiative (RGGI) formally begins in January 2009, and will be North America's first regional GHG cap and trade market. It will cover CO_2 emissions from power plants in 10 northeastern US states. The first auction of allowances was held in September 2008. It was generally viewed as a success and allowances sold at prices above the auction reserve price. The RGGI has established its own offset program, with highly standardized protocols for six categories of regional projects. It has also crafted a unique offset limit, which increases and expands eligibility to offsets outside the region as allowance prices rise.

Also in September 2008, the Western Climate Initiative (WCI) released its design recommendations for a regional emission trading system. Comprising seven US states and four Canadian provinces, the WCI has a regional goal of reducing emissions to 15% below 2005 levels by 2020. It will have the broadest coverage of any cap and trade system to date, covering 90% of regional emissions by encompassing the residential, commercial, industrial and transportation sectors in addition to electricity. It is scheduled to begin operation in January 2012, and will allow offsets to be used for up to 49% of emission reductions.

The voluntary offset market, which is targeting companies and individuals, is also poised for rapid expansion. Some predict that the voluntary market could rival today's

CDM market within five years, with over half of this activity in the US (Trexler, 2007 and ICF International, 2006, as cited in Broekhoff, 2007). At the same time, the lack of common rules, transparent procedures and overall rigor in the voluntary market has led to increasing concerns about the credibility of the offset market.

The Voluntary Carbon Standard (VCS) was launched at the end of 2007. The VCS is a base-quality voluntary offset standard that aims to unify the voluntary market and provide basic quality assurances. The standard has very broad industry support. It will be interesting to see if the VCS will become the main standard in the US and if it will to some extent replace the Chicago Climate Exchange (CCX) and Green-e as voluntary emission reduction (VER) standard providers.

Many observers think it increasingly likely that Federal legislation authorizing a national US cap and trade system could be signed by 2010, given the support expressed for such legislation by the incoming US President Barak Obama. Most of the climate policy bills submitted during the current session of Congress contained provisions for offsets under a cap and trade system. The most prominent of them, the America's Climate Security Act (the "Lieberman-Warner" bill), would have allowed for the use of domestic offsets to meet up to 15% of the overall emissions cap, and the use of international allowances or offsets for another 15%. Such legislation could create a market for domestic offsets in the US alone worth USD 10 to USD 20 billion per year by 2020.[4]

Finally, the Bali Action Plan adopted in December 2007 at the conference of the parties to the United Nations Framework Convention on Climate Change (UNFCCC) has increased expectation that emission trading, and the CDM in particular, will continue to play a key role in any post-2012 international agreement (Point Carbon, 2008).

4 This is a rough estimate based on estimates of allowance prices using modeling of an early version of the bill by the Nicholas Institute, assuming that offsets trade for close to the estimated allowance price for 2020 (USD 23/tCO_2 in USD at 2005 prices), and that the allowed emissions by covered sources is roughly 5 billion tCO_2e. USD 20/tCO_2 times 15% times 5 billion tons equals USD 15 billion. http://www.nicholas.duke.edu/institute/econsummary.pdf

3 A COMPARISON OF OFFSET PROGRAMS

Rising concern over the threat of climate change has led to an expanding number of mandatory and voluntary greenhouse gas (GHG) emission reduction programs and activities, of which offsets are a common feature.

Every mandatory GHG emission trading system to date has allowed for the use of offsets by regulated entities to meet their compliance obligations. Mandatory compliance regimes such as the Kyoto Protocol, the European Union Emission Trading Scheme (EU ETS) and, to a lesser extent, regional programs in Australia, the US and Canada have been the principal drivers in the creation of project-based emission reduction offsets. These regimes and programs are responsible for well over 90% of the financial transactions and offsets generated to date. Most of the transactions and offsets have been generated from projects in developing countries through the Clean Development Mechanism (CDM).

The design features of, and the experience and lessons learned from, the CDM are thus of central importance to participants in and designers of current and future offset programs. Although dominant, however, the CDM is far from the only program to learn from. This report reviews the key design elements and experience of over 25 major programs and efforts to create and guide offset markets across the world: mandatory compliance programs that drive the demand for offsets; offset creation and certification programs designed for this mandatory compliance market such as the CDM and Joint Implementation (JI); voluntary compliance and emission trading programs such as Climate Leaders and the Chicago Climate Exchange (CCX); offset providers and funds; and offset standards and protocols such as the Voluntary Carbon Standard (VCS). As is noted above, this report aims to be relatively comprehensive in its coverage of the mandatory compliance market for GHG offsets and as up to date as possible with respect to offset standards and protocols, but it covers only selected offset providers and funds because the voluntary market is vast and changes rapidly.

This section is a summary comparison of the key features of the programs reviewed in detail in the main body of the report. Five tables compare the programs' key features and help the reader to assess how they differ in terms of market size and scope, project eligibility, additionality and quantification procedures, and project approval processes (program administration and authority).[5] Each table is introduced with a brief overview and comments on some of the key features. The tables list mandatory systems first, followed by voluntary programs and retailers.

The four offset retailers were chosen to illustrate the services provided by voluntary offset providers. Voluntary offset providers, aggregators and funds provide a variety of services to individuals and organizations, including sourcing, aggregation (portfolio creation) and quality assurance of offsets for individuals and business seeking to meet

5 This review and comparison builds on unpublished work prepared by Derik Broekhoff of the World Resources Institute, which was funded by the World Economic Forum.

their own goals and objectives. Several of these programs have been operating for over a decade – the Climate Trust, for example, was established to assist with compliance with Oregon's power plant emission regulations in 1997 – but most of the offset providers have entered the market much more recently.

There is now a little more than a decade of documented experience in offset program design, and it is anticipated that there will be an expanding role for offsets in the design of future climate mitigation policy. Thus, the compilation of lessons learned in this report is a valuable opportunity to inform future offset program developments.

3.1 General features of offset programs

Table 3.1 summarizes the nature and regional scope of the selected offset programs and gives their start dates.

Mandatory systems

Mandatory systems require regulated emission sources, by national, regional or provincial law, to achieve compliance with GHG emission reduction requirements. Offsets serve as an alternative compliance mechanism that emission sources can use to meet these requirements. In most cases, these sources are regulated under cap and trade emission trading regimes, such as the Regional Greenhouse Gas Initiative (RGGI) or the EU ETS.

The two international mandatory project-based offset mechanisms established under the Kyoto Protocol, the CDM and JI, were established in 2001 and began issuing registered offsets in 2005. The participants in the EU ETS, the governments of the EU member states, the Japanese government and industry are the principal buyers of CDM and JI offsets. The remaining mandatory programs that use offsets are located in North America and Australia. Many of these programs only recently got underway or are still under development. A notable exception is the New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS), which has operated since 2003.

Voluntary systems

The voluntary offset market includes a wide range of programs, entities, standards and protocols. Voluntary emission reduction programs such as Climate Leaders and the CCX set participating entities emission targets, which can partly be met through offsets certified through their respective protocols.

Offsets generated through voluntary markets, known as Verified or Voluntary Emissions reductions (VERs), have been promoted as an opportunity for experimentation and innovation. They have the general advantage of lower transaction costs than offsets generated for use in mandatory compliance programs. However, the lack of quality control – and the resulting attention attracted by substandard offset credits in the voluntary market – have generated concern from the wider offset market.

In response, carbon market actors along with key business and environmental interests have launched several efforts to create standards and protocols to improve the quality and credibility of voluntary offsets. These standards and protocols differ significantly in their goals and the services provided. At one end are complete standards that provide rules and administrative bodies for accounting, quantification, monitoring, verification, certification and, in some cases, registration of offsets. These fuller standards, which include the Gold Standard and the VCS, among others, tend to build on existing rules and procedures in compliance markets, most notably the CDM. These standards are designed to provide offset providers with quality assurance certification for their products and offset consumers with greater transparency and confidence in the credibility and integrity of certified offsets.

At the other end are offset protocols which are more limited in scope, such as the International Organization for Standardization (ISO) standard 14064 and the GHG Protocol for Project Accounting. Such protocols provide common definitions, accounting frameworks and quantification options that can be adopted or adapted by individual offset programs or standards. In this sense, these protocols can be viewed as building blocks for standard and program development. For example, the VCS has adopted ISO-14064 for its accounting procedures.

There are other institutions, standards, and criteria that provide a mix of services for designing, screening, certifying or registering offsets. The California Climate Action Registry (CCAR), which is increasing its focus on offsets, provides a project registry and has developed selected quantification protocols for selected project types. The Green-e Climate Program audits and certifies carbon offset retailers and ensures that their marketing claims are truthful. Other standards, such as the Climate, Community and Biodiversity Standards (not discussed here) provide design criteria to ensure robust project design and, particularly in this case, local community and biodiversity benefits.

The proliferation of standards, protocols and other programs reflects the significant flux and experimentation in today's voluntary offset market. Some consolidation of standards is likely to occur in future years. At the same time, because of the differing objectives of many voluntary market participants, especially with respect to the local impacts and benefits of offset projects, multiple standards and screens are likely to remain lasting features of the voluntary market.

Table 3.1: General features of offset programs[6]

Name of program	Regional scope	Type of program	Start of program
International Offset Mechanisms			
Clean Development Mechanism (CDM)	International (covers all countries that have ratified the Kyoto Protocol)	Project-based offset mechanism under the Kyoto Protocol	General rules established in 2001, first offset issued in 2005
Joint Implementation (JI)	Annex-1 parties to the Kyoto Protocol	Project-based offset mechanism under the Kyoto Protocol	General rules established in 2001.
Mandatory Cap and Trade Systems (Offset Features)			
Australia National Emissions Trading System	Australia	Under development. National cap and trade system proposed with offsets as potential compliance mechanism.	Design expected by end of 2008. Start expected by 2010.
Canada's Offset System for Greenhouse Gases	Canada	Under development. National emission intensity targets with offsets as proposed compliance mechanism	Rules expected in 2008
New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS)	NSW, Australia	State per capita-based cap and trade system with offsets as unlimited compliance mechanism	Started in January 2003
Regional Greenhouse Gas Initiative (RGGI)	Northeast US states: CT, DE, ME, NH, NJ, NY, VT, MA, RI, and MD	Regional cap and trade with offsets as limited compliance mechanism	Starts in 2009.
Western Climate Initiative (WCI)	Western states (AZ, CA, MT, NM, OR, UT, and WA) and Canadian provinces (BC, MB)	Under development. Regional cap and trade system with offsets as potential compliance mechanism	Starts in 2012

6 All sources are cited in the specific program review sections.

Name of program	Regional scope	Type of program	Start of program
Other Mandatory Systems (Offset Features)			
Alberta Offset System	Canadian province of Alberta	Provincial intensity-based emission regulations allow for unlimited offsets as a compliance option	Started in July 2007
State power plant rules (OR, WA, MA)	Oregon Washington Massachusetts	OR/WA: Legislated emission standard MA: State cap with offsets as limited compliance mechanism	OR: Started in 1997 WA: Started in 2003 MA: Started in 2006
Carbon Finance Funds			
World Bank Carbon Finance Funds	International	Offset Fund	Established in 1999
Voluntary Cap and Trade Systems (Offset Features)			
Chicago Climate Exchange (CCX)	Originally only in the US but has been expanded. International membership now possible.	Voluntary compliance cap and trade with offsets as unlimited compliance mechanism	Launched in 2002
Voluntary GHG Reduction Programs			
Climate Leaders	Primarily US	Voluntary compliance program with offsets as unlimited compliance mechanism.	Launched in 2002. Offset program under development.
California Climate Action Registry (CCAR)	US (mainly California)	GHG registry	Active since 2002
Voluntary GHG Accounting Protocols			
WBCSD/WRI GHG Protocol for Project Accounting	Not defined	Offset standard protocol	Published in 2005
ISO 14064	Not defined	Voluntary protocol and project standard	Launched in 2006

Name of program	Regional scope	Type of program	Start of program
Voluntary Standards for Offset Projects and Retailers			
Gold Standard (GS)	International	Carbon offset standard	Launched in 2003
Voluntary Offset Standard (VOS)	International	Carbon offset screen	Launched in 2007
Voluntary Carbon Standard 2007(VCS 2007)	International	Offset standard	Launched in 2007. Version 1 launched in 2006.
Green-e Climate Protocol for Renewable Energy	US	Voluntary GHG protocol	Launched in 2007
Green-e Climate Program	US focus/International	Voluntary certification program	Launched in 2007
Voluntary Offset Retailers			
Climate Trust	US	Retail/Bulk Offset Provider	Founded in 1997
TerraPass	North America	Retail Offset Provider	Founded in 2004
NativeEnergy	US	Retail Offset Provider	Founded in 2000
Myclimate	International	Retail Offset Provider	Established in 2002

3.2 Market size and scope

Offset markets are growing rapidly and increasing in significance. From 2005 to 2007 alone, the transaction value of the global market for primary and secondary project-based emission reductions grew by 470% from USD 2.9 to USD 13.6 billion (Capoor and Ambrosi, 2007 and 2008).[7] The market continues to be dominated by the main offset mechanisms of the Kyoto Protocol – the CDM and the JI. In 2007, the CDM accounted for 87% of project-based transaction volumes and JI transactions doubled in volume and tripled in value over their 2006 levels, with European and Japanese entities as the major buyers. The remaining market activity split among other compliance mechanisms and voluntary purchases (Capoor and Ambrosi, 2008).

The Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC), Yvo de Boer, has stated that the CDM could become a USD 100 billion per year market.[8] On the other hand, if and when project types, sectors and countries become increasingly covered by emission caps or other regulations, the market for offsets could begin to decline as allowance allocation and trading or other policy instruments take on a greater role. Thus, the ultimate fate of the offset market is far from clear. It will depend on the role policymakers assign to offsets in an efficient, equitable and effective policy regime that comprehensively addresses the climate change challenge.

Table 3.2 compares the market size and the scope of various offset programs and providers, to the extent that information could be compiled. Compiling estimates of the size or volume of the offset market is challenging because metrics vary and information is often proprietary, especially within the voluntary market. The different metrics can be especially confusing. Some figures for offset market activity represent total offset transactions in a given year, including both primary (by original offset providers) and secondary (resold offsets) transactions, some are for primary transactions alone, while others represent the total offsets registered or certified (which may include expected offsets generated in future years) or issued during a given year. The resulting estimates of the "size of the CDM market" can thus vary by as much as an order of magnitude. For example, slightly over 100 million Certified Emission Reductions (CERs) have been issued to date, while other figures refer to the 1.2 to 2.6 billion CERs registered and in the "pipeline", that is, that could be issued *cumulatively* by 2012 if projects registered, and those under development, yield credits as expected. Readers should thus view market size estimates with caution, and with careful attention to precisely what is being counted.[9]

7 A primary transaction occurs between the original owner (or issuer) of the Carbon asset and a buyer (Capoor and Ambrosi, 2007). A secondary transaction occurs where the seller is not the original owner (or issuer) of the Carbon asset (Capoor and Ambrosi, 2007).

8 UNFCCC Press Release, September 19 2006

9 Those interested in more detailed and up-to-date assessments should consult market analyst publications such as those produced by Point Carbon, New Carbon Finance and Ecosystem Marketplace; as well as the annual State of the Carbon Market review published by the World Bank.

Compliance (mandatory) markets

Only offsets generated from the CDM and JI project-based mechanisms are eligible for compliance under the EU ETS and for compliance with the Kyoto Protocol, which makes such offsets by far the largest component of the compliance offset market. Demand from the EU ETS, as the largest mandatory cap and trade system, has dominated the purchasing of offsets in recent years. These account for almost 90% of CDM and JI purchases to date. The Japanese government and private entities are the other significant buyers (Capoor and Ambrosi, 2008).

Outside of the Kyoto Protocol instruments (the CDM and JI), the NSW GGAS is the second largest offset market. As of February 29 2008, nearly 63.3million metric tons (Mmt) ofCO_2e in offset credits had been created under the program (NSW GGAS, 2008).

Voluntary markets

Estimates of the size of the voluntary offset market vary widely and sales information from retail offset providers can be difficult to track. According to Hamilton, during 2006 voluntary offset market transactions totalled 23.7Mmt of CO_2e (see Figure 1.1). Transactions through the CCX account for 10.3MmtCO_2e, and the remaining 13.4MmtCO_2e was transacted through the voluntary offset providers, retailers and purchasers surveyed by Hamilton *et al*. (2007). These values may be conservative because of the lack of complete reporting. On the other hand they may include some double counting of offsets because they include surveys of both providers and purchasers. Individuals, organizations and businesses in the US dominate voluntary offset purchases. Almost 60% of global voluntary offset market transactions were in the US in the first three quarters of 2007, with transactions as part of the CCX accounting for close to half of the US volume (Point Carbon, 2007c).

Offset prices

Offset prices tend to vary based on the project type, its location, the market demand and the stringency of the offset program requirements. Offset prices in the compliance market are driven primarily by the supply of and demand for offsets and allowances. Demand drives prices for offsets. It is therefore not surprising that offsets for the mandatory market fetch considerably higher prices than voluntary offsets.. This is most apparent when comparing the price of CDM offset credits to those available on the voluntary offset market, as is shown in Table 3.2.

These price estimates should be viewed with caution, since they represent only a brief snapshot of an often volatile market. Nonetheless, they illustrate that prices vary by an order of magnitude depending on the program, its requirements and, perhaps most importantly, the markets in which the offsets are sold. For example, prices for CDM and JI offsets are linked to the broader markets for EU ETS and Kyoto allowances. Depending on the extent to which delivery of CERs and emission reduction units (ERUs) is guaranteed, they can garner upwards of 80% of the trading price of EU allowances. Even though in principle CERs, ERUs, and EU allowances are fully fungible, countries have “supplementarity” limits on the amount of CERs and ERUs

they can purchase to meet their compliance obligation. To the extent that these limits are expected to be binding, and thus that the supply of CERs and ERUs is expected to exceed allowable demand under the supplementarity limits, CERs and ERUs will trade for prices lower than allowances. It is not clear whether this will occur in the period to 2012.

Prices for voluntary offset credits vary significantly based on the standards used, project types, project locations, offset quality, delivery guarantees and contract terms. Of the five offset retailers reviewed in this report, the price per metric ton ranges from USD11–12 for the US-based Climate Trust, TerraPass and NativeEnergy projects, up to USD 35 for the Gold Standard CERs and VERs sold through myclimate. No clear connection has been found between the offset sale price of non-profit vs. for-profit retailers (Kollmuss and Bowell, 2007). No readily available metrics currently exist for consumers to determine either how the price of offset credits sold in the voluntary market is determined, or the role the offset price has on the quality of the offset purchased.

Table 3.2: Market size and scope (estimates as of July 2008 or most recent date available)

Name of program	Tradable unit name and acronym	Participants/buyers	Unit of measurement	ERs to date ($MmtCO_2e$)*	Projected ERs by 2012 ($MmtCO_2e$)*	Indicative prices§ (USD/metric ton in early 2008 unless noted)
International Offset Mechanisms						
Clean Development Mechanism (CDM)	Certified Emissions Reduction (CER)	Public and private entities within the jurisdiction of Kyoto Protocol member countries; other entities may use/retire them under voluntary offset programs	metric	170	1200–1400 CERs issued	Primary market USD 23 – USD 24 (EUR 14.50 - EUR 15) Secondary market: USD 35 (EUR 22)
Joint Implementation (JI)	Emissions Reduction Unit (ERU)	Same as CDM	metric	N/A	180–280	N/A
Mandatory Cap and Trade Systems (Offset Features)						
Australia National Emissions Trading System	Under development	Under development. Expected to be compliance entities in the nation	metric	n.d.	n.d.	n.d.
Canada's Offset System for Greenhouse Gases	Under development	Compliance entities in the nation	metric	n.d.	n.d.	n.d.
New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS)	NSW GHG Abatement Certificates	Compliance and elective entities in the state	metric	68	n.d.	USD 4 (Sept. 2007)
Regional Greenhouse Gas Initiative (RGGI)	CO_2 Offset Allowances	Compliance entities in the region	short	n.d.	n.d.	n.d.

Name of program	Tradable unit name and acronym	Participants/buyers	Unit of measurement	ERs to date ($MmtCO_2e$)*	Projected ERs by 2012 ($MmtCO_2e$)*	Indicative prices§ (USD/metric ton in early 2008 unless noted)
Western Climate Initiative (WCI)	Under development	Under development. Expected to be compliance entities in the region	Not yet specified	n.d.	n.d.	n.d.
Other Mandatory Systems (Offset Features)						
Alberta Offset System	Alberta-based offset credit	Compliance entities in the province	metric	1.5	n.d.	n.d.
State power plant rules (OR, WA, MA)	Oregon: CO_2 offsets Washington: Carbon credits Massachusetts : GHG Credits	Compliance entities in the state	short	Oregon: 1.5	n.d.	Oregon: USD 1.40 Washington: USD 1.60 Massachusetts: USD 5
Carbon Finance Funds						
World Bank Carbon Finance Funds	CER and ERU	Government agencies and private sector companies	metric	6.9	300	n.d.
Voluntary Cap and Trade Systems (Offset Features)						
Chicago Climate Exchange (CCX)	Carbon Financial Investments (CFI)#	CCX members and non-members such as offset brokers	metric	44	n.d.	USD 2-8

Name of program	Tradable unit name and acronym	Participants/buyers	Unit of measurement	ERs to date ($MmtCO_2e$)*	Projected ERs by 2012 ($MmtCO_2e$)*	Indicative prices§ (USD/metric ton in early 2008 unless noted)
Voluntary GHG Reduction Programs						
Climate Leaders	External GHG reductions	Climate Leaders partners	short	n.d.	n.d.	N/A
California Climate Action Registry (CCAR)	N/A	N/A	metric	N/A	N/A	N/A
Voluntary GHG Accounting Protocols						
WBCSD/WRI GHG Protocol for Project Accounting	N/A	N/A	N/A	N/A	N/A	N/A
ISO 14064	N/A	N/A	N/A	N/A	N/A	N/A
Voluntary Standards for Offset Projects and Retailers						
Gold Standard (GS)	GS CER and GS VER	Offset retailers, providers, individuals, organizations and businesses	metric	0.7	n.d.	Average price premium GS VERs: 20–100% above comparable VERs GS CERs: 5–25% above regular CERs
Voluntary Offset Standard (VOS)	Verified Emissions Reduction (VER)	Large multinational financial institutions	metric	n.d.	n.d.	n.d.
Voluntary Carbon Standard 2007(VCS 2007)	Voluntary Carbon Unit	Voluntary offset retailers and providers, individuals, organizations and businesses.	metric	n.d.	10–20	USD 8–24 (VCS version 1)

Name of program	Tradable unit name and acronym	Participants/buyers	Unit of measurement	ERs to date ($MmtCO_2e$)*	Projected ERs by 2012 ($MmtCO_2e$)*	Indicative prices§ (USD/metric ton in early 2008 unless noted)
Green-e Climate Protocol for Renewable Energy	VER	Offset retailers, individuals, organizations and businesses	metric	n.d.	n.d.	n.d.
Green-e Climate Program	VER and CER	Carbon offset retailers	(varies by program certified)	n.d.	n.d.	Varies by offset retailer
Voluntary Offset Retailers						
Climate Trust	VER	Individuals, organizations and businesses Compliance entities under the Oregon state power plant rule	metric	2.6	n.d.	USD 12
TerraPass	VER	Individuals, organizations and businesses	pounds	0.5	n.d.	USD 13
NativeEnergy	VER	Individuals, organizations and businesses	short	n.d.	n.d.	USD 11
Myclimate	CER and VER	Individuals, organizations and businesses	metric	0.1	n.d.	USD 36 - 107

* Values in these columns are estimates of cumulative ERs generated. Refer to section for discussion. Estimates may not be fully comparable.
n.d.: No data readily available; N/A: not applicable
§ Indicative prices are from 2008 and are drawn from a wide range of sources; prices may fluctuate significantly, especially those linked to trading markets. Prices are rounded to the nearest US dollar, and where based on euros reflect an exchange rate of EUR 1 = USD 1.54 (http://www.federalreserve.gov/releases/h10/update/ accessed on March 21 2008)
#Units are denominated in 100 metric tons of CO_2

3.3 Offset project eligibility

Table 3.3 shows offset eligibility requirements for each offset system or program. These requirements reflect the specific context and objectives of each system. Design features are commonly added to limit offset projects to a particular location or project type in order to direct offset investments to favored regions, project types or technologies. Some offset programs and standards also include environmental and social objectives as project eligibility criteria.

In general, offset programs tend to focus on either encouraging regional investment or supporting sustainable development and providing financial flows to developing economies. While sustainable development and technology transfer to developing countries was an explicit design goal of the CDM and the Kyoto Protocol, many of the regional and provincial mandatory compliance programs outside the Kyoto Protocol prefer to maintain benefits and build support through investment in local or regional communities and enterprises.

Project location

Table 3.3 shows the eligible project locations but not the distribution of offset project activities to date under each program. The distribution of project locations and project types reflects not only where market opportunities lie (e.g. the supply of low-cost emission reductions), but also the capacity of national and local institutions to engage in the offset market, as well as the transaction costs and other barrier they may face. For instance, in the CDM over 73% of offset project transactions in 2007 were for projects located in China, but only 6% in India, 11% in Latin America, 5% in Africa and 5% in the rest of Asia (Capoor and Ambrosi, 2008). China possesses abundant low-cost opportunities to reduce the emission of so-called high global warming impact "industrial gas", in particular HFC-23 and N_20 produced as the unwanted by-products of refrigerant and chemical manufacturing, respectively. As is illustrated in Figure 3.1, industrial gas projects represented nearly half of the CDM offsets sold in 2006. China also has an increasingly well-developed infrastructure for developing and approving offset projects.

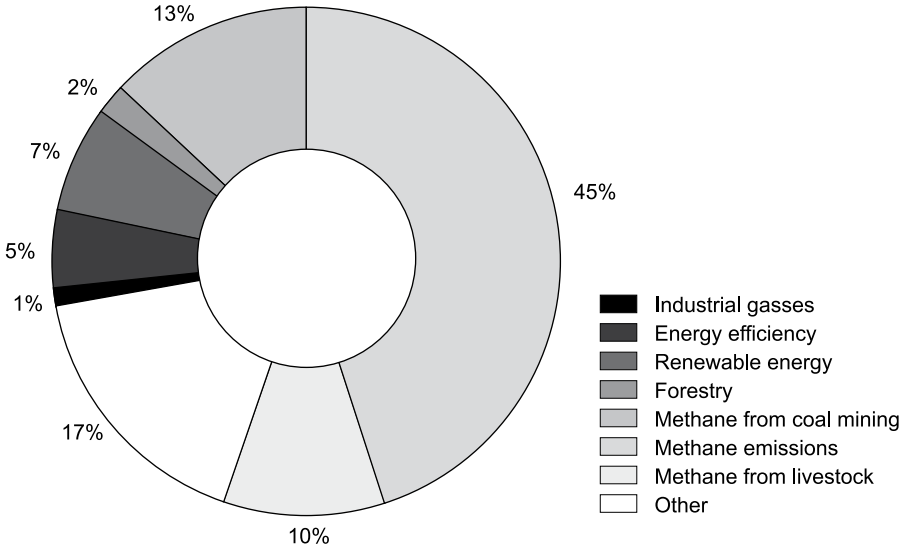
In the voluntary market, 39% of all offsets sold in 2007 originated from projects located in Asia and 27% from projects located in North America (Hamilton, 2008).

Issues with Renewable Energy Credits

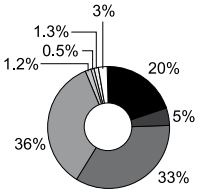
In the voluntary carbon offset market, Renewable Energy Credits (RECs), generated through the production of renewable energy, are increasingly being converted to and sold as carbon-offset equivalents. This practice has been highly controversial because of concerns raised regarding the additionality and ownership of converted RECs (Gillenwater, 2007.) For further discussion on the use of RECs see section 10.6 section 11.4.

Figure 3.1: Offset project types and transaction volumes in 2006

Kyoto Projects (CDM and JI)
Total Volume in 2006: 466 $MmtCO_2e$



Voluntary Offset Projects (CDM and JI)
Total Volume in 2006: 13 $MmtCO_2e$ (Excluding CCX transactions of 10.3 $MmtCO_2e$)



(Source: Capoor and Ambrosi, 2007; Hamilton, 2007)

Project type

After industrial gas projects, renewable energy has been the second largest project type in the CDM, followed by a variety of methane capture and combustion activities ranging from landfills to coal mines and livestock management (see Figure 3.1). Much less common offset project types include), among others, energy efficiency and biological carbon sequestration – ranging from forestry and agricultural activities to avoided land use change.

In contrast, Figure 3.1 shows that forestry carbon sequestration projects, closely followed by renewable energy projects together accounted for about two-thirds of the voluntary carbon market in 2006 outside of the CCX. Thus far, agricultural soil management projects (e.g. no till practices) have dominated the CCX offset project portfolio.

Bottom-up or top-down approaches

In addition to the relative cost of implementing projects, the availability of program-approved methodologies for quantifying emission reductions or removals is a key determinant of the mix of project types in the market today. In general, offset programs have developed two different approaches to determining offset project-type eligibility. At one end is the bottom-up approach used under the CDM, where project types are considered, as submitted by the project developers, and approved if deemed adequate by the administrative body or program authority (CDM Executive Board, CDM EB). At the other end is a top-down approach, such as that taken by RGGI which spelled out in its Memorandum Of Understanding and Model Rule precisely which project types would be eligible, and which methodologies applicable, from the outset of the project (although other project types would be considered).

Project start date

The project start dates listed in Table 3.3 refer to the cut-off date for project commencement. In principle, a project type that has commenced prior to the start date would be considered ineligible, although precise definitions of start-up vary among programs. The typical rationale for setting a start date is to help to ensure that offset programs actually lead to a project happening, that is, that they are additional. Therefore, the project start date is generally linked to the timing of the launch of the overall offset program. The start dates of some programs, such as the CCX, predate the start of the offset program launch and reflect the grandfathering of offset credits created through other certification programs (e.g., RECs).

Table 3.3: Offset project eligibility

Name of program	Eligible project locations	Eligible project types	Project start date
International Offset Mechanisms			
Clean Development Mechanism (CDM)	Developing (non-Annex 1) countries where Designated National Authorities (DNAs) are established	All eligible except nuclear energy, new HCFC-22 facilities or avoided deforestation	January 1 2000
Joint Implementation (JI)	Annex 1 countries that are signatories to the Kyoto Protocol with capped emissions	Same as CDM except land-use, land-use change and forestry (LULUCF) projects, which are not limited to just afforestation and reforestation project	January 1 2000
Mandatory Cap and Trade Systems (Offset Features)			
Australia National Emissions Trading System	Under development. Design recommendations include both domestic and international offset projects.	Under development. Design recommendations have prioritized the following project types: land use, forestry, wood products, avoided deforestation and carbon geosequestration	Under development
Canada's Offset System for Greenhouse Gases	Under development	Under development	Under development
New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS)	Within New South Wales only, except for electricity generation projects which can be within the Australian National Electricity Market.	• Additional electricity from low emission sources (including use of RECs as compliance units) • Supply side energy efficiency at existing power stations • Demand side energy efficiency • Industrial on-site emission reductions • Forest carbon sequestration (afforestation or reforestation)	Electricity generation: January 1 2003 Demand side management: January 1 2002 in NSW and January 1 2004 in the ACT Carbon sequestration: January 1 2003

Name of program	Eligible project locations	Eligible project types	Project start date
Regional Greenhouse Gas Initiative (RGGI)	Within RGGI participating states or other approved jurisdictions If emission allowances exceed the Stage 2 trigger price (USD 10), the eligible project locations is expanded to include offsets from any governmental mandatory program outside the US with a tonnage limit on GHG emissions.	• Landfill methane capture and destruction; • Reduction in emission of sulfur hexafluoride(SF_6); • Sequestration of carbon due to afforestation; • Avoided/reduced natural gas or oil combustion due to end use energy efficiency in the building sector; • Agricultural manure management operations; • Continued development of additional eligible project types expected	December 20 2005
Western Climate Initiative (WCI)	WCI approved and certified offsets from projects in the US, Canada, and Mexico; and, CDM offsets, perhaps subject to added criteria or standards	Under development. Priorities for protocol investigation and development include: • Agriculture (soil sequestration and manure management) ; • Forestry (afforestation/reforestation, forest management, forest preservation/conservation, forest products); and • Waste management (landfill gas and wastewater management).	Under development
Other Mandatory Systems (Offset Features)			
Alberta Offset System	Alberta only	All project types with approval by Alberta Environment.	January 1 2002
State power plant rules (OR, WA, MA)	Oregon: Any location Washington: Not specified Massachusetts: Limited to 10 Northeast states (CT, DE, ME, MA, MD, NH, NJ, NY, VT) and US Coastal Waters. Boundary expanded to any location if offset trigger price is exceeded.	OR or WA: no limitations or specifications MA: Any except nuclear power generation, underwater and underground sequestration.	OR and WA: no limitations MA: January 1 2006

Name of program	Eligible project locations	Eligible project types	Project start date
Carbon Finance Funds			
World Bank Carbon Finance Funds	No limitations. Requirements vary by fund.	CDM/JI requirements apply. Additional limitations vary by fund.	CDM/JI requirements apply
Voluntary Cap and Trade Systems (Offset Features)			
Chicago Climate Exchange (CCX)	Any country except European Union Emission Trading Scheme member countries or Annex 1 countries that are signatories to the Kyoto Protocol	Energy efficiency and fuel switching, coal mine methane, agricultural methane, agricultural soil carbon, rangeland soil carbon, forestry carbon, landfill methane, ozone depleting substance (ODS) destruction and renewable energy.	January 1 1999 Forestry projects: January 1 1990 ODS projects: January 1 2007
Voluntary GHG Reduction Programs			
Climate Leaders	US	Current eligible projects: landfill methane collection and combustion manure management (dairy or swine) transit bus systems industrial and commercial boilers afforestation/reforestation projects Additional project types eligible with protocol approval by US Environmental Protection Agency (EPA).	Under development
California Climate Action Registry(CCAR)	US	Current eligible projects: afforestation conservation-based forest management reforestation livestock and landfill methane capture	Carbon sequestration: January 1 1990 Methane capture: January 1 2001

Name of program	Eligible project locations	Eligible project types	Project start date
Voluntary GHG Accounting Protocols			
WBCSD/WRI GHG Protocol for Project Accounting	Not defined	Project guidance can be applied to any project type. Specific guidelines have been developed for grid-connected electricity and LULUCF projects.	Not defined
ISO 14064	Note defined	Not defined	Not defined
Voluntary Standards for Offset Projects and Retailers			
Gold Standard (GS)	All locations, except in countries with emission caps unless Gold Standard (GS) Verified Emission Reductions (VERs) are backed by permanently retiring assigned amount units (AAUs)	Renewable energy and energy efficiency projects. Excludes hydropower larger than 15 MW	January 1 2006
Voluntary Offset Standard (VOS)	All locations, except in countries with emission caps unless GS VERs are backed by permanently retiring AAUs	CDM/JI requirements apply. Additional exceptions include HFC and large hydropower projects.	CDM/JI requirements apply
Voluntary Carbon Standard 2007 (VCS 2007)	All locations, except in countries with emission caps unless voluntary carbon units (VCUs) are backed by permanently retiring AAUs.	All project types eligible with VCS approved methodology, except projects from new industrial gas facilities	January 1 2002 Future restrictions: Start date must be within 2 years of validation date.
Green-e Climate Protocol for Renewable Energy	US	Renewable energy projects: wind, solar, hydropower (up to 5 MW; additional specifications), geothermal, methane capture, ocean thermal wave and tidal energy New project types evaluated on case-by-case basis	January 1 2005

Name of program	Eligible project locations	Eligible project types	Project start date
Green-e Climate Program	Specified by applicable offset standard	CDM standard requirements except LULUCF and hydropower >10 MW excluded All VCS 2007 except hydropower >10 MW and additional native species requirement for carbon sequestration projects	January 1 2000
Voluntary Offset Retailers			
Climate Trust	US and International	No limitations	After date of project approval with the Climate Trust
TerraPass	US	Renewable energy projects: wind energy methane capture	see CCX and VCS
NativeEnergy	US	Renewable energy projects: wind energy solar energy methane capture	N/A
Myclimate	Non-Annex 1 countries or Switzerland	Renewable energy and energy efficiency projects	see Gold Standard

3.4 Additionality and quantification procedures

Table 3.4 shows the different approaches to additionality assessment and quantification procedures across various offset programs. These are described further below. First, some of the key terminology as well as some of the key elements of additionality and baseline evaluation are reviewed.

The design elements most fundamental to ensuring that offset projects are "real" and "quantifiable" have also been the most contentious. 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"? In practice, however, determining whether an offset is "real" through additionality requirements presents a significant design challenge. Quantification of an offset project's GHG benefits relies on the development of a baseline scenario, a *hypothetical* scenario of emissions that would have occurred had the activity *not* been implemented as an offset project. By definition, this baseline scenario will never occur; instead, the offset credits generated from a project are quantified with incomplete certainty based on the difference in emissions between the offset project and the baseline scenario.

Offset programs and providers differ in their overall approaches to additionality and quantification procedures. Top-down programs tend to provide specific detailed accounting rules upfront, while bottom-up programs tend to offer only general guidelines for project GHG accounting and instead evaluate projects on a case-by-case basis.

Project-based versus standardized additionality testing

There are two broad design approaches to evaluating additionality and the closely linked process of determining baselines: *project-specific* and *standardized* (often called 'performance standards'). The project-specific approach involves the evaluation of individual projects based on one or more additionality tests. These project-specific additionality tests are commonly based on the "CDM additionality tool" (See CDM Additionality Tool Text Box), which evaluates whether the offset project is dependent on offset project revenue ("investment test") or whether it has overcome significant implementation barriers ("barriers test"). In addition, the CDM tool requires that the technology or practice used by the project must not be in common use ("common practice test"). Most programs also require projects to be "regulatory surplus", that is, that they exceed existing legal requirements.

Due in part to concerns regarding the partly subjective nature of some project-based methods, several offset programs and protocols incorporate or rely exclusively on standardized methods to assess additionality. Standardized methods include, among others, performance thresholds (emission rates or other characteristics defined based on similar activities) and clearly defined common practice tests (e.g. lower than a specified level of market penetration for similar activities). Climate Leaders, the CCAR, the CCX, RGGI and the NSW GGAS are among the programs and protocols

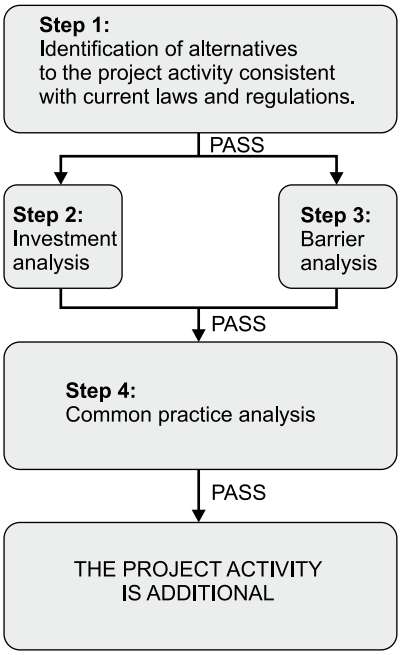
that rely more heavily on standardized approaches. The GHG Protocol for Project Accounting and International Organization for Standardization (ISO) 14064 standards provide guidelines for both approaches..

Baselines and quantification procedures

Offset programs also differ significantly in how emission reductions or removals are quantified for individual offset projects. The expansion of offset programs in recent years has led to a proliferation of baseline and monitoring quantification protocols, which are now far too abundant for them all to be described in detail here. For example, the CDM includes over 70 approved methodologies for different project types. Table 3.4 therefore focuses on the process by which quantification protocols are developed. Approved methodologies include project-specific baselines developed from the bottom up by project participants and developers, the performance standard approach developed from the top down by program administrators and authorities or some hybrid of the two. Programs designed to accommodate an expanding set of offset project technologies have tended to opt for a bottom-up approach, the CDM being the classic example. Others, such as RGGI, have incorporated a significant body of existing work on protocol developments, and have opted for a more top-down prescriptive approach. Both top-down and bottom-up programs vary in their use of project-specific or performance standard approaches to determining baselines.

CDM additionality tool

Flowchart of the CDM Additionality Tool version 4



Investment analysis

Revenue from the carbon offsets must be a primary driver for project implementation;

or

Barriers Analysis

Project implementation must require the ability to exceed implementation barriers, such as local resistance, lack of know-how, and institutional barriers;

and

Common practice analysis

Projects must employ technology that is not very commonly used.

Source: UNFCCC (2004), EB-36 Report, Annex 13

Table 3.4: Additionality and Quantification Procedures

Name of program	Additionality and related requirements	Quantification (baseline/monitoring) protocols
International Offset Mechanisms		
Clean Development Mechanism (CDM)	CDM additionality tool Step 1: Identification of alternatives to the project activity consistent with mandatory laws and regulations Step 2: Investment analysis or Step 3: Barrier analysis, Step 4: Common practice analysis, Steps 1, 4 and either 2 or 3 are must be fulfilled	Baselines defined by methodologies (proposed by project proponents, reviewed by Methodology Panel), many using standardized equations, some based on project-specific parameters. No standardized protocol for monitoring. Monitoring is done in accordance with the process laid out in the registered Project Design Document (PDD).
Joint Implementation (JI)	Either the same as CDM requirements, or Demonstrate use of conservative assumptions Based on comparability of the project with another Accredited Independent Entity determined (registered) project	CDM requirements apply
Mandatory Cap and Trade Systems (Offset Features)		
Australia National Emissions Trading System	Under development	Under development
Canada's Offset System for Greenhouse Gases	Under development. Expected to be based on ISO 14064.	Under development
New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS)	Based on positive technology list and established baseline scenarios	Explicit rules and instructions for baseline quantification provided in GHG Benchmark Rules for each type of project activity. Monitoring requirements are outlined by the program administrator and in the GGAS regulation requirements.
Regional Greenhouse Gas Initiative (RGGI)	Regulatory surplus test No credits for electric generation within RGGI No funding from any system or customer benefit fund No credits or allowances awarded under any other mandatory or voluntary GHG program.	Baseline and monitoring protocols are outlined in detail for each eligible offset project type in the RGGI Model Rule.

Name of program	Additionality and related requirements	Quantification (baseline/monitoring) protocols
Western Climate Initiative (WCI)	Under development	Under development
Other Mandatory Systems (Offset Features)		
Alberta Offset System	Regulatory surplus test Real (specific and identifiable actions that reduce or remove GHGs) Demonstrable (demonstrate a net reduction in GHGs) Quantifiable	Quantification protocols are developed by Alberta Environment or proposed by project developers and reviewed and approved by Alberta Environment
State power plant rules (OR, WA, MA)	Regulatory surplus test (OR and MA only) Offsets must be "real"	OR and MA: Regulation provides guidance for required documentation for quantification. WA: no guidelines
Carbon Finance Funds		
World Bank Carbon Finance Funds	CDM/Gold Standard requirements apply	CDM/Gold Standard requirements apply
Voluntary Cap and Trade Systems (Offset Features)		
Chicago Climate Exchange (CCX)	Regulatory surplus test Defined as new project Common Practice test	CCX-developed pre-defined baselines and methodologies for each specific project type
Voluntary GHG Reduction Programs		
Climate Leaders	Largely a performance standard approach Regulatory surplus test.	Baseline and monitoring protocols are outlined in detail for each eligible offset project type.
California Climate Action Registry (CCAR)	Performance standard approach where possible Regulatory surplus test	Performance standards used where possible General project-specific monitoring protocols developed

Name of program	Additionality and related requirements	Quantification (baseline/monitoring) protocols
Voluntary GHG Accounting Protocols		
WBCSD/WRI GHG Protocol for Project Accounting	Project-based and performance standard approaches guidelines provided. No requirements	Generic guidelines for project-specific and performance standard baseline quantification and monitoring protocols. No requirements.
ISO 14064	Project-based and performance standard approaches guidelines provided. No requirements	General guidance offered for baseline quantification and monitoring protocols. No requirements.
Voluntary Standards for Offset Projects and Retailers		
Gold Standard	CDM additionality tool (latest version) Previous announcement checks	GS CERs: all methodologies approved by CDM EB GS VERs: all methodologies approved by CDM EB, Small Scale Working Group (SSCWG), United Nations Development Program (UNDP) Millennium Development Goals (MDG) Carbon Facility New methodologies must be approved by GS Technical Advisory Committee.
Voluntary Offset Standard	CDM/Gold Standard requirements apply	CDM/Gold Standard requirements apply
Voluntary Carbon Standard 2007 (VCS 2007)	Regulatory surplus test Implementation barriers test Common practice test Performance-based and positive technology list-based approaches will be eligible in the future. No performance tests or technologies have yet been approved by VCS.	Project-specific quantification protocols approved by VCS. All CDM methodologies approved.
Green-e Climate Protocol for Renewable Energy	Regulatory, legal, institutional surplus test and; Timing test (project start date) Technology test and performance test	Project-specific standardized methodology developed

Name of program	Additionality and related requirements	Quantification (baseline/monitoring) protocols
Green-e Climate Program	Requirements of each standard apply	Requirements of each standard apply
Voluntary Offset Retailers		
Climate Trust	Regulatory surplus test Barriers test Common practice test.	Baseline quantification developed initially by project developers and verified by third-party auditors. Monitoring plans must meet requirements established by the Climate Trust.
TerraPass	VCS and CCX requirements apply	Not publicly available
NativeEnergy	Regulatory surplus test Barriers test Common practice test.	Project-specific quantification protocols developed
Myclimate	CDM/Gold Standard requirements apply	CDM/Gold Standard requirements apply

3.5 Program administration and authority

Table 3.5 lists the actors responsible for regulating various key aspects of each offset program: overall administration, validation and/or verification, and project approval and registration. All offset programs include some form of administrative body to oversee the project approval process to ensure that the offset projects developed meet established program requirements. Although there are several common components of the project approval process, programs have developed varied approaches to confront key quality assurance concerns.

- *Validation* requirements provide *ex-ante* assessment and confirmation of offset project eligibility as defined by the rules of the program or standard.

- *Verification* requirements provide *ex-post* assessments and confirmation of quantification of the volume of emission reductions or removals that have been produced from an offset project across a certain period of time.

- *Registries* have been used to reduce concerns regarding double counting by tracking information regarding ownership and development of the offset projects and the credits generated.

- *Third-party auditors* are required by some programs to help limit any potential conflict of interest between offset project developers and buyers, which both have financial incentives for inflating the volume of offset credits generated.

- *Project approval* requirements vary among standards. Some programs have a decision- making body that approves offset projects after documentation is submitted by auditors/project developers. Other programs use the auditors to approve the projects and there is no additional project approval step.

The structure of program administrators varies by program type and design (see Table 3.5). Compliance programs are generally administered by either an existing regulatory agency, as in the case of state regulatory agencies under RGGI, or an administrative body established exclusively for the offset program, as in the CDM EB. Voluntary offset providers are managed by a mix of Boards of Trustees, advisory committees and paid staff.

Nearly all programs require some form of project validation and verification. Increasingly, programs require verification to be conducted by an approved third-party auditor independent of either the program administrator or the project developer. Exceptions include the NSW GGAS, which assesses the need for project verification on a case-by-case basis, and the Climate Leaders program, which recommends but does not require third-party verification.

Some programs/standards give their auditors the decision-making power to approve or reject a project. Others have a separate body to evaluate and approve projects. Such a

program or standard-based decision-making body adds another layer of quality control. Offset programs have incorporated the use of carbon offset registries to keep track of offset ownership and to minimize the risk of double counting. A registry assigns a serial number to each verified offset and once the offset is "used" to claim emission reductions, the serial number is retired preventing the credit from being resold. No universal registry exists for either the compliance or voluntary offset markets, limiting their utility for minimizing double counting across the offset market. Instead, different registries have been developed; some tied to specific retailers, standards or compliance programs, as in the case of the CDM Registry and the CCX Registry, and others which function independently.

Table 3.5: Project Approval Process: Program Administration and Authority

Name of program	Who administers?	Who validates/ verifies?	Who approves/ registers?	Name of registry
International Offset Mechanisms				
Clean Development Mechanism (CDM)	CDM Executive Board	Designated Operational Entities (DOEs)	CDM Executive Board	CDM Registry
Joint Implementation (JI)	JI Supervisory Council	Accredited Independent Entity (AIE)	AIE unless a review is requested, in which case the JI Supervisory Council approves the project	Offset credits tracked in respective National Registries.
Mandatory Cap and Trade Systems (Offset Features)				
Australia National Emissions Trading System	Under development	Under development	Under development	Under development
Canada's Offset System for Greenhouse Gases	Environment Canada	Under development	Environment Canada	Under development
New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS)	Independent Pricing and Regulatory Tribunal of NSW (IPART)	Approved third-party auditor in Audit and Technical Services Panel.	IPART	NSW GGAS Registry
Regional Greenhouse Gas Initiative (RGGI)	State regulatory agencies	Accredited independent verifier	State regulatory agencies	Under development
Western Climate Initiative (WCI)	Under development	Under development	Under development	Under development
Other Mandatory Systems (Offset Features)				
Alberta Offset System	Alberta Government	Endorsed by third-party auditor	Alberta Environment	Alberta Offset Registry currently under development
State power plant rules (OR, WA, MA)	OR: Energy Facility Siting Council WA: Energy Facility Site Evaluation Council MA: Department of Environmental Protection	Varies (Climate Trust performs this function in OR and WA)	Varies	N/A

Name of program	Who administers?	Who validates/ verifies?	Who approves/ registers?	Name of registry
Carbon Finance Funds				
World Bank Carbon Finance Funds	World Bank: Carbon Finance Unit, Fund Management Committee	DOEs	CDM requirements apply	CDM/JI Registries
Voluntary Cap and Trade Systems (Offset Features)				
Chicago Climate Exchange (CCX)	CCX Committee on Offsets.	CCX-approved verifiers	CCX Committee on Offsets	CCX Registry
Voluntary GHG Reduction Programs				
Climate Leaders	The US Environmental Protection Agency (EPA)	EPA	EPA	Recommends use of independent registry, although not required.
California Climate Action Registry (CCAR)	Board of Directors, CCAR Registry Staff	Approved third-party verifiers	State of California and CCAR	CCAR
Voluntary GHG Accounting Protocols				
WBCSD/WRI GHG Protocol for Project Accounting	N/A	N/A	N/A	N/A
ISO 14064	N/A	N/A	N/A	N/A
Voluntary Standards for Offset Projects and Retailers				
Gold Standard (GS)	Gold Standard Foundation, GS Secretariat, Foundation Board, GS Technical Advisory Committee (GS TAC), GS NGO Supporters	DOEs	GS TAC, GS Secretariat, GS NGO Supporters	Gold Standard VER Registry

Name of program	Who administers?	Who validates/ verifies?	Who approves/ registers?	Name of registry
Voluntary Offset Standard	International Carbon Investors and Services (INCIS)	DOEs	DOEs	Under development
Voluntary Carbon Standard 2007 (VCS 2007)	VCS Association	Accredited VCS auditors	Accredited VCS auditor	Required. Registry not specified.
Green-e Climate Protocol for Renewable Energy	Center for Resources Solutions (CRS)	Green-e Climate Protocol for Renewable Energy	Green-e Climate Protocol for Renewable Energy	Use of electronic tracking systems for Renewable Energy Certificates is required. Registry not specified.
Green-e Climate Program	Center for Resources Solutions (CRS)	Green-e Governance Board/ Accredited third-party auditor	See requirements of approved standards under Green-e Climate	Required. Registry not specified
Voluntary Offset Retailers				
Climate Trust	Board of Directors, Advisory Council and employed staff	Third-party verifier	Climate Trust	Internal Registry
TerraPass	Employed staff	Green-e CRS and CCX requirements apply	see VCS and CCX	CCX and Green-e registries used
NativeEnergy	Employed staff	Independent certified public accountant	Native Energy	N/A
Myclimate	Board of Trustees, Patronage Committee, Employed staff	CDM-accredited or Gold Standard-approved third-party auditor	see GS	CERs: Swiss National Registry GS CERs and GS VERs: Gold Standard Registry

4 INTERNATIONAL OFFSET MECHANISMS

The Clean Development Mechanism (CDM) and Joint Implementation (JI) are project-based offset mechanisms under the Kyoto Protocol, a legally binding international treaty to reduce global greenhouse gas (GHG) emissions that was negotiated in 1997 and entered into force in 2005. Under the treaty, a group of industrialized countries and countries with economies in transition (EIT)[10] have legally binding commitments to reduce their overall GHG emissions to 5% below 1990 levels during the period 2008–2012. Each country within the group also has a separate target that ranges between an 8% reduction to a 10% cap on increases in emissions (UNFCCC, 1997).

JI is the instrument for offset projects taking place within countries with binding emission commitments under the Kyoto Protocol, while the CDM is for offset projects in countries without such commitments, that is, most developing countries. Both the CDM and JI provide Kyoto countries with the flexibility to meet a part of their emission target obligation in a more cost-effective manner by purchasing offset credits generated by GHG abatement projects in other Kyoto countries. However, the Kyoto Protocol requires that the use of the offset and other flexible mechanisms such as emission trading be supplemental to domestic action taken by countries to meet their commitments, and it is left to each country to decide the extent to which these mechanisms may be used (UNFCCC, 1997). Furthermore, in addition to the objective of economic efficiency, the CDM has the objective of promoting sustainable development and technology transfer in host countries.

The market for CDM and JI credits took off well before the start of the Kyoto Protocol commitment period. This was largely due to the 2004 decision by European Union (EU) member states to link the CDM and JI to the EU Emission Trading Scheme (ETS), an EU-wide mandatory cap and trade program for CO_2 emissions. The aim of linking the offset mechanisms to the EU ETS was to allow regulated EU installations (i.e. emitting facilities covered by the Protocol) access to low-cost compliance options, thus reducing their overall costs of compliance with EU ETS obligations (EC, 2004). Demand from other Kyoto countries, most notably Japan, as well as from EU governments themselves has also been driving the demand for CDM and JI offset credits.

The EU ETS regulates CO_2 emissions from 12,000 installations, accounting for half of all EU GHG emissions, through the allocation of permits or emission allowances (Kopp, 2007). In addition to achieving reductions at the installation itself, regulated installations are allowed to meet their targets either by purchasing emission allowances from other installations or by supplementing the purchase of allowances using CDM /JI offset credits. The EU ETS is currently in its second phase (2008–2012), which coincides with the Kyoto commitment period, and each EU member state's limit on the

10 The group is made up of: Australia, Austria, Belgium, Bulgaria, Canada, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, the Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, the United Kingdom and the United States as well as the European Community. This group is listed in Annex B of the Kyoto Protocol and is referred to as the 'industrialized and EIT countries' throughout this document.

use of CDM/JI credits is based on its annual emission allowance allocation approved by the European Commission.[11] Under Phase III of the EU ETS (2013–2020), the European Commission has submitted its proposal for a substantial overhaul, including abandoning the system of national allocation plans and developing EU-wide cap and allocation rules.

11 A summary table of supplementarity limits approved under the EU ETS Phase II National Allocation Plans is available in a European Commission Press Release of 7 December 2007, available at http://tinyurl.com/3j3zdh.

The European Union Emission Trading Scheme

Lessons Learned

Built on the US experience in sulfur oxide (SOx) emission trading, the European Union Emission Trading Scheme (EU ETS) is the first practical experiment in GHG emission trading. It has made a significant contribution to the establishment of a global carbon market by placing a clear constraint on carbon dioxide (CO_2) emission by market participants where none existed before. The implementation of the first phase of the EU ETS has several important lessons for subsequent phases as well as for the design of market-based programs currently under development in other countries. To share its experience, in October 2007, the EU co-founded the International Carbon Action Partnership with a group of countries and regions that had either established a mandatory cap and trade system or were actively pursuing one (EC, 2007).

The EU ETS has been the primary driver of growth in the offset credit market. It allowed offset credits generated under the Kyoto Protocol's Clean Development Mechanism (CDM) and Joint Implementation (JI) to be used under the EU ETS, creating demand for these credits and mobilizing investments in low carbon technologies in developing countries and in countries with economies in transition (EIT). However, concerns have been raised by NGOs, such as the World Wildlife Fund (WWF), about the use of CDM and JI credits. These organizations argue that the substantial use of offset credits is locking the EU into high carbon investments (WWF-UK, 2007).

Limits on the use of CDM and JI credits in the second phase of the EU ETS range from 0% of the annual emission allowances allocated in Estonia to 20% in Germany, Lithuania and Spain (EC, 2007a). When these limits are compared to the actual reductions that would be needed, it appears that, in some countries, no domestic reductions will be required, thereby defeating the supplementarity principle of the EU ETS which requires the use of offset credits to be supplemental to domestic action to achieve emission reductions. This is confirmed in the WWF's analysis of the second phase limits on the use of CDM/JI credits applicable in nine countries[12] representing 80% of the EU's emissions, where it concluded that 88–100% of the actual emission reductions required each year could be achieved through CDM and JI credits. The WWF recommends that this figure not exceed 50% (WWF-UK, 2007). However, the International Emissions Trading Association (IETA) contends that these limits on the use of CDM and JI credits reduce the system's ability to mobilize significant capital for low carbon technologies and increase the abatement costs for industry to prohibitively high levels (IETA, n.d.).

Other issues have been raised, including the sustainability impact of CDM and JI projects, the need to increase participation in under-represented countries and sectors, and the varying approval processes in different member countries. Regarding sustainability, the WWF recommends that all of the CDM and JI credits used under the EU ETS should be certified by the Gold Standard (WWF-UK, 2007), while the IETA argues for more diverse approaches to demonstrating environmental additionality to increase participation (IETA, n.d.). IETA also proposes the expansion of eligible offset project types to include land use, land-use change and forestry (LULUCF) projects, which are currently exempt under the EU ETS, and the proposed harmonization of the approval process of

12 Germany, the United Kingdom, Poland, Ireland, France, Spain, the Netherlands, Portugal and Italy

CDM and JI projects across EU member states in Phase III (IETA, n.d.).

For its third phase, post-2012, the EU advocates the transition of the CDM beyond a pure project-by-project offsetting mechanism to a broader crediting approach.[13] Such an approach could enable a massive scale-up of clean low-emission technologies and would potentially increase the environmental integrity of offsets and also facilitate contributions from developing countries. The EU is also considering other means of scaling up participation among developing countries using sector-based approaches such as binding sector-wide targets or 'no-lose targets', where credits are awarded for beating emission targets but no penalties are imposed for missing them.

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13 N. Dault, personal communication, European Comission, June 10 2008.

4.1 Clean Development Mechanism (CDM)

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

Overview

Type of System/Program and Context

The Clean Development Mechanism (CDM) is a project-based GHG offset mechanism under the Kyoto Protocol. The scheme aims to assist Annex-I parties (industrialized countries with binding emission reduction targets) to cut global GHG emissions in a more cost-effective manner by allowing them to invest in offset projects in non-Annex I parties (developing countries without binding targets). The CDM also aims to assist non-Annex I parties achieve sustainable development, to contribute to the ultimate objective of the treaty, to stabilize GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system within a time-frame that allows ecosystems to adapt naturally, and to ensure that food production is not threatened and that economic development proceeds in a sustainable manner.

The parties to the United Nations Framework Convention on Climate Change (UNFCCC) negotiated and adopted the Kyoto Protocol in 1997. Initially, they only sketched out the basic features of the offset mechanism. In 2001, following a series of negotiations, the rules governing the operation of the mechanism were fleshed out in what are now known as the Marrakech Accords. The first CDM project was registered in 2004, and in the following year, after Russia's ratification of the Protocol saw it enter into force, the first emission reduction credit was issued to a project. Since then, the scheme has grown rapidly and now dominates the offset market. Since September 2007, the CDM has self-financed its regulatory functions through fees charged to projects and no longer relies on grants from Annex-I countries.

Program authority and administrative bodies

The functioning of the CDM is overseen by the CDM Executive Board (EB), a 10-member team representing different UN regions and interest groups under the Kyoto Protocol. The EB is supported by expert panels, which focuses on specific tasks such as the accreditation of designated operational entities or auditors (the Accreditation Panel), and reviewing the methodologies for setting the baseline for projects and monitoring them (the Methodologies Panel) and for reviewing requests for project registration and issuance (Registration and Issuance Team). The EB is ultimately accountable to the governing body of the Kyoto Protocol, which includes representatives of all the countries that have ratified the treaty.

Within each member country, a Designated National Authority (DNA) is required to issue letters of approval to projects confirming their voluntary participation in the CDM, and host countries must confirm that the activity assists the country to achieve sustainable development.

Regional Scope

The scope of the CDM program is international, involving all countries that have ratified the Kyoto Protocol.

Recognition of Other Standards/ Linkage with Other Trading Systems

Although the tradable units of other schemes cannot be used as CDM credits, several other compliance programs and voluntary standards either already recognize and accept Certified Emission Reduction (CERs) or plan to do so in the near future. Such schemes or standards include the EU ETS, the Regional Greenhouse Gas Initiative (RGGI), Canada's Offset System for Greenhouse Gases, the Voluntary Carbon Standard (VCS), the Voluntary Offset Standard (VOS) and Green-e. The Gold Standard certifies projects that use CDM methodologies and also comply with additional Gold Standard criteria.

Market size and scope

Tradable unit and pricing information

The tradable unit under the CDM is a Certified Emissions Reduction (CER). Each CER is equal to one metric ton of CO_2e emissions abated.

As of July 16 2008, Point Carbon reported that prices in the primary market for CERs ranged between USD 23–24 (EUR14.50–EUR15), while the prices for secondary CERs for December 2008 delivery were trading at USD 35 (EUR 22) (Point Carbon, 2008).

Participants/buyers

Both public and private entities develop CDM projects and sell or buy the generated CERs to comply with their domestic or international emission reduction targets. Under the CDM, the project must be based in a non-Annex I (developing) country, but the project developers, CER buyers and other participants may be based in any country, provided they are authorized to participate in the project by the project host country's DNA. Other parties involved in project development and the CER trade include intermediary buyers, such as private carbon trading firms (e.g. EcoSecurities, Tricorona Carbon Asset Management, EDF Trading, etc.) or public institutions (e.g. the World Bank). CERs can also be sold into the voluntary market. About 16% of voluntary offsets traded (by volume) were CDM and JI credits (Hamilton, 2008). Buyers may also be from voluntary programs.

Current project portfolio

There were a total of 3,580 projects in the CDM pipeline on June 11 2008 (see Table 4.1. Status of CDM Projects). This figure includes 82 projects that were either rejected by the EB or withdrawn by the project developer. Of the remaining, 1,080 projects had been registered and were expected to generate 1,310 million CERs by 2012.[14] As of

14 This analysis is based on the latest available information as of June 11 2008. The CER market is dynamic and fast-changing. At that time, 1130 projects had been registered, with the potential to generate 1290 million CERs by 2012. See http://cdm.unfccc.int/Statistics/index.html for the most up-to-date information.

Table 4.1: Status of CDM Projects

Status of CDM projects	Number
Validation stage	2,256
Request for registration stage	53
Request for review stage	37
Correction requested	52
Under review	20
Total in the process of registration	162
Withdrawn	16
Rejected by EB	66
Total rejected or withdrawn	82
Registered, no issuance of CERs	725
Registered, CER issued	355
Total registered	1,080
Total number of projects (incl. Rejected and withdrawn)	3,580

Source: UNEP Risoe Centre 2008

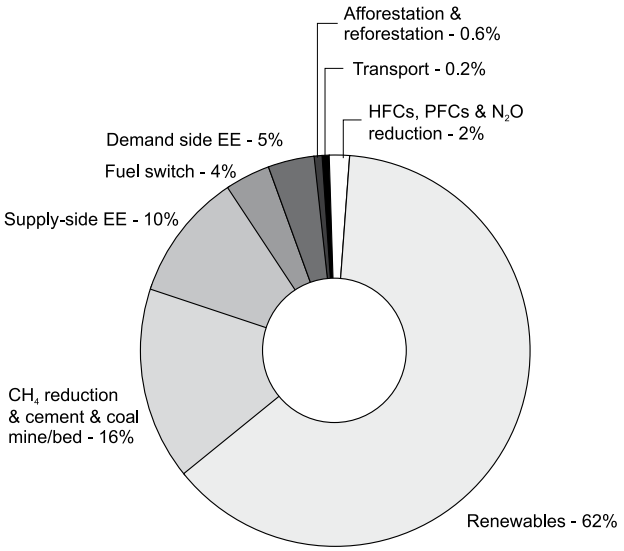
July 28 2008, 170 million CERs had already been issued (Point Carbon, 2008). The remaining 2,256 projects were at the validation stage and 162 projects were at various stages in the registration process. Together, these are expected to generate 1,330 million CERs by 2012. The estimated 2640 million CERs in 2012 assumes a 96.8% issuance success rate, an 18.5% chance of a negative Designated Operational Entity (DOE) validation and a 5% chance of being rejected by the EB (UNEP Risoe Centre, 2008). The distribution of CDM project types shown in Figure 4.1 indicates the dominance of renewable energy and HFC-s, PFCs- and N_2O- reduction projects. The share of CERs by project type, shown in Figure 4.2, indicates that CERs from HFC, PFC, and N_2O projects have leveled off since 2007.

Offset project eligibility

Project types

Any project is eligible that reduces or avoids emissions of one of the six Kyoto GHGs below the level projected in the absence of the registered activity, apart from nuclear energy projects, new HCFC-22 facilities and avoided deforestation. Additional restrictions may also be placed on hydropower projects to ensure that they meet the requirements of the World Commission on Dams. Purchasing countries may impose additional unilateral project-specific restrictions on CERs. For example, the EU ETS does not currently allow the use of offsets generated from forestry projects.

Percentages of CDM projects in each category (by number of projects)



Expected CERs Until 2012 (%) in each category

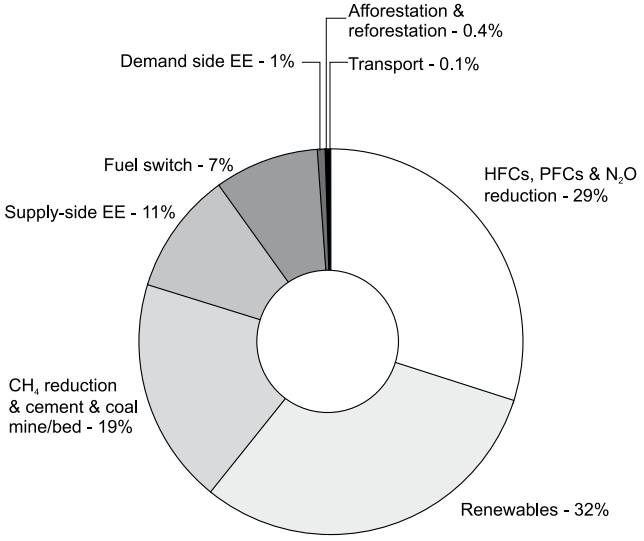


Figure 4.1: Distribution of CDM projects and CERs by project type
Source: UNEP Risoe Centre 2008

Growth of total expected accumulated 2012 CERs

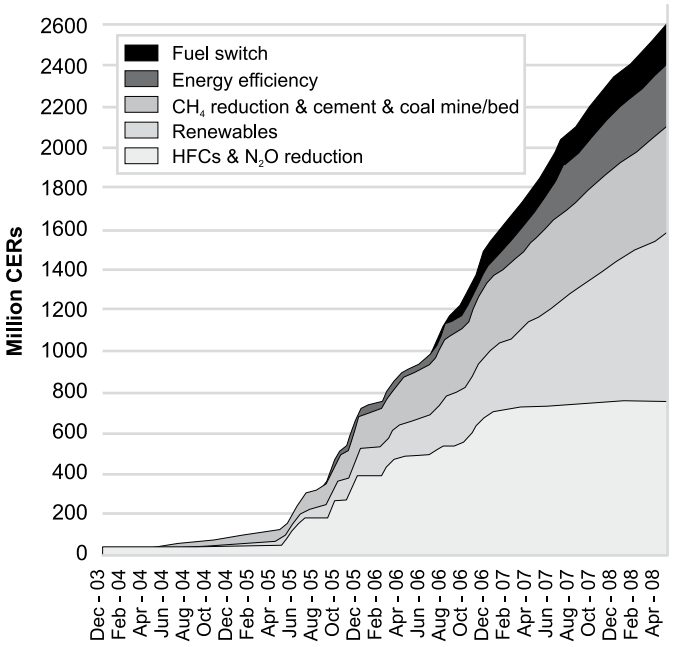


Figure 4.2: Share of CERs by project type (December 2003 – April 2008)

Project locations

A CDM project must be located in a non-Annex 1 country that has ratified or acceded to the Kyoto Protocol.

Project size

The only specific project size limitations are for small-scale renewable energy projects, which must have a maximum output capacity of 15 MW and result in up to 15 GWh per year of energy savings from energy efficiency projects or savings of up to 15,000 $mtCO_2e$ per year for other project types (UNFCCC, 2008).

Start date

Only projects that started on or after 1 January 2000 are eligible for consideration. The earliest possible start date for the crediting period is the start date of the project or the registration date of the project, whichever is later.[15] If a project generated emission reductions before it was registered, then those emission reductions are not eligible to be issued as CERs. However, some of these ineligible emission reduction credits are being sold as VERs on the voluntary market (often called pre-registration credits).

15 Note that until the end of 2006, credits could be awarded to "prompt start" projects for emissions reductions occurring prior to project registration. The prompt start window was created to encourage the development of CDM projects while the infrastructure for project registration was still being established.

Similarly, some projects that have failed to qualify under the CDM are finding their way to the carbon market as VERs.[16].

Crediting period

The crediting period for all CDM projects, except afforestation and reforestation projects, can be either:

- seven years with the option of up to two renewals of seven years each if the project baseline is still valid or has been updated with new data; or
- 10 years with no renewal option.

For afforestation and reforestation projects, the choice is between:

- 20 years with up to two renewal periods of 20 years each; or
- 30 years with no renewal.

Co-benefit objectives and requirements

While there are no explicit guidelines for the environmental or social co-benefits of CDM projects, the Kyoto Protocol requires that CDM projects assist the host country in achieving sustainable development. The sustainable development criteria for evaluating CDM projects are accordingly set by each host country and may include social benefits such as improvements in the quality of life, alleviation of poverty and greater equity, as well as environmental benefits such as conservation of local resources, removing pressure on local environments, health benefits and compliance with domestic environmental policies. Some countries levy taxes on CDM activities that have no apparent direct sustainable development impacts in order to re-channel funds into activities that assist them with achieving sustainable development (e.g. China places a levy on HFC 23 activities).[17]

Additionality and quantification procedures

Additionality requirements

Each CDM project must demonstrate that the CDM was essential to bringing the project to fruition, or that in the absence of the CDM, the project would either not have gone ahead or have used an inferior technology, resulting in higher GHG emissions. Baseline methodologies incorporate these additionality requirements, which usually involve three of the four steps outlined in the "CDM Additionality Tool":

- ***Identifying alternatives***: Identifying realistic and credible alternatives to the proposed project activity that are compliant with current laws and regulations;

16 K.B. Schmidt, personal communication, UNFCCC, June 27 2008.

17 K.B. Schmidt, personal communication, UNFCCC, June 27 2008.

- ***Investment analysis***: to determine that the proposed project activity is not the most economically or financially attractive;

- ***Barrier analysis***: Analysis of barriers that prevent the implementation of the proposed project activity or do not prevent the implementation of one of the alternatives;

- ***Common practice analysis***: Analyzes whether the proposed project activity is 'commonly practiced' by assessing the extent of diffusion of the proposed project activity.

Steps 1 and 4 are required for all projects, whereas project developers have a choice of fulfilling either step 2 or step 3 to fulfill the additionality requirement.

Quantification protocols

The CDM uses a bottom-up approach. Project developers propose new methodologies and once these methodologies are reviewed and approved, they can be used to approve other projects of the same type. New methodologies are first reviewed by a Designated Operational Entity (DOE), an independent CDM-accredited auditor, on behalf of a project developer. The methodology is then reviewed and assessed by the CDM Methodology Panel, incorporating expert input and public comments. Finally, it is approved or rejected by the CDM EB.

Existing methodologies have been amended and refined over time as new projects have been proposed and approved with amendments to existing methodologies. Furthermore, similar methodologies for certain types of project, such as landfill gas projects or grid-connected renewable energy electricity projects, have been consolidated into single methodologies to make them applicable to a broad range of projects. The CDM EB has issued tools that developers can draw on to address common methodological features when proposing new methodologies.

The baseline methodologies for afforestation and reforestation projects must account for leakage by including information on the sources of leakage and how they will be accounted for. The information submitted must specify the relevant leakage calculations, indicate how the values will be obtained and describe the uncertainties associated with key parameters. Furthermore, if some leakage sources are not accounted for, the Project Design Document (PDD) must explain why these sources where excluded. International leakage and market shifting do not need to be accounted for.

The risk of carbon being re-released into the atmosphere by forest destruction is addressed by requiring forestry CDM projects to produce temporary emissions credits referred to as either "temporary CERs" (tCERs) or "long-term CERs" (lCERs). Both types of CER have expiration dates, after which they must be replaced by another tradable emissions unit under the Kyoto Protocol. The tCERs and lCERs may be cancelled if verification reveals that the stored carbon for which they were issued was

released back into the atmosphere. On cancellation, they must be replaced by another Kyoto Protocol emissions trading unit.

Project approval process

Validation and registration

The validation and registration processes for project developers involve several steps. It starts with the preparation of a PDD detailing the project activities, the baseline methodology used to quantify the emission reduction, the monitoring process and information relating to the local stakeholder process that the project proponent conducts. The document is then made publicly available for comment. The PDD and the public comments are then reviewed by a CDM-approved auditor (a DOE). This may involve visits to the project site and consultations with the local stakeholder. Once the review is complete, the DOE prepares a Validation Report confirming that the project is a valid CDM project.

Prior to registration, the CDM Designated National Authority (DNA) in the country hosting the project needs to provide a letter of approval. The DNA will issue such a letter confirming its approval of the project if the project meets the host country's sustainable development criteria, complies with the country's laws and regulations and fulfills any other requirement specified by the DNA. In some countries the validation report referred to above is a prerequisite for the host country to assess the activity.

Following host nation approval, all of the documents are then submitted to the CDM EB for registration and made publicly available. The project is registered if, within an eight-week period (weeks for small-scale projects), there are no objections from either the member countries involved in the project or three or more EB members.

Monitoring, verification and certification

Once the project is operational, the project must be monitored periodically in accordance with the monitoring plan. A Monitoring Report has to be prepared recording the CERs generated, which is made public at the start of the DOE assessment process. Once again, the DOE must verify this report, and based on its assessment prepare a Verification Report and a Certification Report, confirming the emission reductions achieved. The same auditor who validates the project cannot serve as the verifier except in the case of small-scale projects.

The Monitoring, Verification and Certification Reports are submitted to the CDM EB requesting the issuance of CERs for the amount of emission reduction achieved and verified. The Registration and Issuance Team assists the EB in the review process. As with the registration process, the request for issuance will be executed after 15 days unless a member country involved in the project or at least three members of the EB request a review of the project during this period.

Registries and fees

The CDM Registry is administered by the UNFCCC secretariat. On instruction by the EB to issue CERs for a project activity, the secretariat forwards the issued CERs to the relevant Holding Accounts. Project participants may have a Holding Account in either the CDM Registry or the National Registry of an Annex-1 country.

For the CERs to be transferred from the CDM Registry account to a National Registry account, they must pass through the International Transaction Log (ITL). The first transfers to the New Zealand, Swiss, and Japanese registries have been completed. The ITL will record transactions of CERs from the CDM registries to the Annex I National Registries. Once the CERs are received in a National Registry account they can either be traded or used for compliance with national targets or regional targets, as is the case with the EU, by retiring the CERs within the registries. At present, CERs cannot be transferred between National Registries, but internal transfers within a National Registry are possible.

The CDM fee structure is as follows:

- A fee of USD 1,000 is charged for a new methodology submission, which, if the methodology is approved or consolidated, is considered as a down payment on the registration fee.

- A registration fee, a down payment accounted for at the time of the first issuance, of USD 0.10 per CER is charged for the first 15,000 CERs issued in a given calendar year A charge of USD 0.20 per CER is made for every additional CER issued up to an upper limit, which is set at USD 350,000. No registration fee is charged if the average annual emissions over the crediting period amount to less than 15,000 tCO_2e. If the project is not registered, then any amount above USD 30,000 is reimbursed to the project developer. Project activities located in the least developed countries (LDCs) do not have to pay a registration fee or a share of the proceeds.

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

Selected issues

The CDM is the most mature of all offset schemes, and it dominates overall offset supply in the carbon market. As a result, more issues have been identified, lessons learned and remedies suggested for the CDM than for any other offset mechanism. There is a growing literature on CDM issues. A few of the issues raised in a number of recent CDM-related publications are summarized below. These issues, as well as the remedies proposed by various authors, are intended to be illustrative rather than comprehensive:

- weakness of long-term market signal;
- ability to finance high capital cost, longer payback investments;
- profits and perversities associated with low-cost non-CO_2 projects;
- potential for offsets to deter the adoption of government policies;
- high transaction costs;
- quality of validation and verification;
- contribution to sustainable development ;
- demonstration of additionality.

Weakness of Long-term Market Signal

Hepburn (2007) notes the widely recognized constraint of the Kyoto Protocol: that there are no binding targets and timetables, and thus there is no firm market for the CDM, beyond 2012. Uncertainty about future markets leads to a transfer of risk from the government to the private sector, which is ill-equipped to deal with such uncertainty. Numerous countries and regions, including several US states, have set emission reduction goals to 2050, many of which are established in legislation, but these alone are insufficient to provide investor certainty.

Proposed remedies

- Contractually bind governments to their long-term goals; set up authoritative agencies to advise governments on achieving their 2050 targets and report annually on progress (Hepburn, 2007).
- Secure a strong post-2012 agreement.

Many other authors and markets are working on proposals to ensure an efficient, effective and fair post-2012 agreement. Some of the suggested changes to the current CDM are discussed below.

Ability to finance high capital cost, longer payback investments

Ellis and Kamel (2007) highlight the challenge of securing financing for projects with high initial investment costs, such as renewable energy systems and re/afforestation activities. As in the case of renewable energy, such projects can involve a long project lead time, and are perceived by financing sources as high-risk projects compared to conventional projects, such as coal- or gas-fired plants. Additionally, power generation projects are usually appraised on the basis of the installation cost (cost per kW installed) rather than the life-cycle cost of production of electricity (cost per kWh), an approach that favors conventional technologies with low capital cost requirements.

Proposed remedies:

- Increase certainty of demand (and price) for CDM credits post-2012 (Ellis and Kamel, 2007).

Profits and perversities associated with low-cost non-CO_2 projects

As Hepburn (2007), Wara and Victor (2007), Schneider (2007) and numerous others have observed, several project types – most notably, the destruction of high global warming potential (GWP) gases (HFC-23 and N_2O) – have dominated the early CDM market and present very low GHG abatement costs (less than 1 USD/tCO_2e). Such projects , it is claimed, have little sustainable development benefit. Furthermore, CER revenues can provide the incentive to increase production of high GWP gases, for example, at refrigerant (HCFC-22) manufacturing facilities where the high GWP gas HFC-23 is a by product. Current CDM rules aim to limit this potentially perverse impact by disallowing CERs for production levels that exceed historical levels (at existing facilities) and by disallowing CDM projects at new HCFC-23 facilities. The latter measure is still being debated by the UNFCCC COP/MOP[18].

Proposed remedies

- Establish separate mitigation regimes for non-CO_2 gases, and create a funding mechanism whereby industrialized countries pay directly for the actual costs of high GWP gas destruction, modeled along the lines of the Multilateral Fund under the Montreal Protocol (Wara, 2006).

- Restrict the CDM to CO_2 and methane, and provide countries with other financial incentives to mitigate other GHGs (Hepburn, 2007).

- Use ambitious benchmarks (emissions per unit of production) to reduce the number of CERs issued while still providing sufficient financial incentives (Schneider, 2007).

Potential for offsets to deter the adoption of government policies

Schneider (2007) and Hepburn (2007) suggest that the CDM can create a perverse incentive for governments in developing countries to avoid enacting or implementing policies that result in emission reducing activities, since doing so might reduce opportunities to garner CER revenues.

Proposed remedies

- Enable a policy-based CDM. The CDM is currently limited to project-based activities; a broader scope could allow developing country governments to garner CERs for the introduction of policies to reduce emissions (Hepburn, 2007). However, Schneider (2007) points out that a policy-based CDM approach raises concerns regarding the assessment of additionality, as there are several motivations for the adoption of policies, and GHG mitigation may only be one of them. Schneider (2007) suggests that policies and measures could be credited indirectly through sectoral approaches.

18 The Subsidiary Body for Scientific and Technological Advice (SBSTA) is considering whether the destruction of HCFC-23 from new facilities should be entitled to emissions credits and be included in the CDM. The issue will be under discussion at the December 2008 COP14 meeting in Poznan, Poland.

- Foster a sectoral CDM approach. Under the sectoral approach, a baseline is established for the whole sector and emissions below the baseline are credited. In most cases, governments can receive the credits and provide incentives or regulations for the private sector to achieve emission reductions. Thus, emissions and reductions are not based on the policies and measures taken by the government, but on the actual observed emissions trend (Schneider, 2007).

High transaction costs

Ellis and Kamel (2007), Cosbey (2005) and Hepburn (2007) point out that the high transaction costs of CDM projects pose a common hurdle for many project developers, especially for small-scale projects and in poor developing countries. Ellis and Kamel explain that this is in part because transaction costs are incurred upfront, while CDM revenue is only generated once the project's methodology has been approved, the project registered and credits issued. Cosbey further points out that high transaction costs may disproportionately affect projects with significant development benefits (Cosbey, 2005)

Proposed remedies

- Reduce the costs associated with validation and verification. Fees paid to DOEs make up a sizable portion of project transaction costs. The establishment and training of developing country DOEs might lower these costs as host country offices are likely to offer a more attractive fee schedule than their northern counterparts (Cosbey, 2005).

- Reconsider the management structure. Instead of having part-time, rotating and appointed board members, a permanent, full-time body could be charged with most of the key decisions, which might reduce the bottlenecks that add to the time and cost of developing projects (Cosbey, 2005).

- Create alternative financing mechanisms to cover transaction costs. Some emission reductions buyers, especially large institutional or national carbon funds, have been offering different types of advance payments to project developers in order to help them overcome the burden of the project's transaction costs. One model involves offering grants, separate from the funds used by the buyer, to purchase emission reductions. Another model is to pay part of the price for the purchased CERs in advance before the project's inception (Ellis, 2007).

- Reduce barriers for programmatic CDM to better support energy efficiency and transportation investments that currently face significant transaction costs due to the small scale of individual activities (Hepburn, 2007).

Quality of validation and verification

As Schneider (2007) observes, the lack of detailed validation and verification standards to guide operational entities, coupled with a weak threat of sanctions and increasing competition, can lead to a 'race to the bottom' in the quality of the validation and

verification processes. These quality concerns are corroborated by the increasing proportion of CDM projects that are being rejected by the CDM EB, and by spot checks at validators and verifiers (DOEs) that have revealed serious shortcomings.

Proposed remedies

- Develop a more in-depth guidance document and training for validators and verifiers (Schneider, 2007).

- Develop a policy framework to address validator/verifier non-conformities and non-compliance in a systematic manner, including criteria for the suspension or withdrawal of accreditation as well as other sanctions. Strengthen the liability of validators/verifiers (DOEs) by requiring them to replace any excessive CERs issued (Schneider, 2007).

- Reduce the potential conflict of interest for validators/verifiers by paying them through the CDM, for example from proceeds to cover administrative expenses, instead of directly through project developers. This would also be beneficial to small-scale projects as it reduces transaction costs (Schneider, 2007).

Contribution to sustainable development

Cosbey (2005), Olsen (2007) and Schneider (2007) highlight that sustainable development plays a limited role in directing investments (Olsen, 2007). While rhetorically mandated in the Kyoto Protocol, sustainable development criteria vary greatly among host countries. Host countries do not necessarily prioritize projects with high sustainable development impacts. In most countries, projects need only comply with one of the sustainable development criteria to be approved. The result is a CDM project portfolio largely determined by the economic attractiveness, potential and risk of the mitigation options (Schneider, 2007).

Proposed remedies

- Foster NGO involvement. Premium markets, such as the Gold Standard, can help bring value to sustainable development achievements. NGOs and research institutions could play a more proactive role in promoting co-benefits by monitoring the results of CDM projects (Cosbey, 2005).

- Establish minimum quotas for high sustainability projects. Furthermore, all or several Annex-I countries could commit themselves to purchasing a minimum quota of projects with a high level of sustainable development benefits (Schneider, 2007).

- Develop clearly defined criteria and guidelines for establishing sustainable development criteria in host countries. Strengthen the capacity building efforts of DNAs to help them enforce clear definitions of sustainable development (Schneider, 2007).

Demonstration of additionality

As Schneider (2007) points out, the issuance of CERs to non-additional projects increases global GHG emissions. Schneider analyzed 93 CDM projects and found that 43% of the projects that claimed barriers as a rationale for additionality did not provide evidence of their existence.. A Delphi survey revealed that 71% of the participants thought that "many CDM projects would also be implemented without registration under CDM" and 85% felt that "in many cases, carbon revenues are the icing on the cake, but are not decisive for the investment decision".

Proposed remedies

The following are among the measures Schneider (2007) suggests to improve the assessment of additionality.

- Establish ambitious and dynamic benchmarks to be used to assess additionality in industries where the data are available (e.g. using the performance of the top plants in the industry as the benchmark).

- Provide clear, explicit guidance for demonstrating additionality, especially for small-scale projects.

- Eliminate the use of highly subjective and company-specific barriers.

- Require investment analysis for all large-scale projects. The use of barrier analysis for large-scale investments is not credible. Investment analysis should be mandatory for such project types, and more specific guidance should be provided.

- Introduce quantitative thresholds for some sectors to make common practice analysis more objective

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4.2 Joint Implementation (JI)

http://ji.unfccc.int/index.html

Overview

Type of System/Program and Context

Joint Implementation (JI), like the CDM, is a project-based mechanism under the Kyoto Protocol. It is limited to transactions between industrialized countries and countries with economies in transition (EIT) that have commitments to limit or reduce their GHG emissions under the Protocol.[19] The goal of the program is to increase market efficiency by allowing industrialized countries to meet a part of their obligation by investing in GHG abatement projects in another industrialized or EIT country if the cost of abatement is lower in the other country.

Like the CDM, the JI mechanism was negotiated in 1997 as a part of the Kyoto Protocol, Its goal is to combat climate change using a flexible GHG trading mechanism. JI grew out of a pilot program which began in 1995. Most of the pilot projects[20] cannot be converted into JI emission reduction credits because they started before January 1 2000, which precludes them from being considered under the JI mechanism (UNFCCC, 2006b).

Although the program became officially operational after the entry into force of the Protocol in 2005, the final determination (similar to registration) of the first JI project was only completed in March 2007. This was because the JI Supervisory Committee (JISC), the governing authority for the JI program, was not established until December 2005, and the verification procedure under the committee was only finalized in October 2006. The program entered its first commitment period under the Kyoto Protocol in January 2008 and it is expected to show better growth in 2008–2009.

The administrative and regulatory functions of the JI will be funded by the fees charged to project participants, and by the core and supplementary budgets of the UNFCCC. However, the funds generated from fees are not expected to accumulate to adequate levels until 2010, so reliance on industrialized and EIT country funding contributions will continue at least until the end of 2009 (UNFCCC, 2007a).

Program authority and administrative bodies

The JI program is supervised by the JISC, a 10-member team with voting rights that represent the EIT countries, the industrialized countries, developing countries and the small island developing states. There are 10 additional members without voting rights

19 The countries are Australia, Austria, Belgium, Bulgaria, Canada, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, the Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, the United Kingdom and the United States as well as the European Community. This group is listed in Annex B of the Kyoto Protocol and is referred to as the 'industrialized and EIT countries' throughout this document.

20 See UNFCCC, 2006c; 79 of the 86 pilot projects in EIT countries started before 2000.

who represent the same country groups as the voting members. They participate in all JISC meetings and share the work responsibilities of the JISC. The JISC is supported by an expert panel for the accreditation of independent auditors (JI Accreditation Panel) and is ultimately accountable to the governing body of the Kyoto Protocol, which includes representatives of all countries that have ratified the treaty.

Within each industrialized and EIT country, there is a Designated Focal Point (DFP) that serves as the nodal agency responsible for administering JI activities within its jurisdiction.

Regional scope

The JI scheme is international in its scope, but only industrialized and EIT countries that have ratified the Kyoto Protocol can host JI projects and issue the emission reduction units generated from the projects.

Recognition of Other Standards/ Linkage with Other Trading Systems

As in the case of the CDM, although the emission reductions of other schemes cannot be used under the JI program, other compliance programs, including the EU ETS, RGGI, the VCS and the VOS, and voluntary standards either recognize and accept JI emission reductions under their schemes or plan to do so in the near future.

Market size and scope

Tradable unit and pricing information

The tradable unit under the JI program is an Emissions Reduction Unit (ERU). Each ERU is equal to one metric ton of carbon dioxide equivalent ($mtCO_2e$). According to the 2008 World Bank report on the carbon markets, ERUs were transacted at an average price of USD 12.20 (EUR 8.90) in 2007, a 38% increase over the 2007 price (Capoor and Ambrosi, 2008).

Participants/buyers

JI project participants include public or private entities based in industrialized and EIT countries that have ratified the Kyoto Protocol, or other legal entities that are approved by the project's host country DFP to participate in the project. Approved entities may develop JI projects, sell the emission reduction generated, or buy ERUs to comply with their domestic and international obligations. To avoid the double counting of units, if industrialized or EIT country participants sell the JI emission reduction generated, they cannot count these reductions towards meeting their own targets. Buyers from other voluntary programs may also purchase JI emission reduction units.

Current project portfolio

As of June 11 2008 there were a total of 141 JI projects in the pipeline (UNEP Risoe Centre, 2008). JI distinguishes between track 1 and track 2 projects. All the projects currently in the pipeline are following track 2 verification procedures. Track 2 projects must be approved by the JISC. Track 1 projects, on the other hand, are approved by their respective host countries. Track 2 projects are located in countries that either do not fully comply with the eligibility requirements for participating in the JI program,

or meet the eligibility requirements, but have voluntarily chosen to use the Track 2 verification procedure under the JISC. Projects that follow the Track 1 verification procedure established by their respective host country governments are located in countries that meet all the eligibility requirements for participating in the JI program and are thus authorized to verify projects. ERUs are issued and transferred by the host country under both the Track 1 and Track 2 verification procedures.

The JI projects in the pipeline have been dominated by renewable energy, methane reduction, cement and coal bed methane project types. However, the majority of ERUs generated have come from methane reduction, cement and coal bed methane projects (see Figure 4.3).

Of the 141 track 2 projects: one has been rejected by the JISC; one project's determination report, which is similar to a validation report under the CDM, has been assessed by the JISC and secured a 'final determination', which is similar to registration under the CDM; one is under review by the JISC; and the rest are at the determination stage.[21] Together, all these projects are expected to reduce emissions by 265MmtCO_2e by 2012. The number of projects in the program's initial phase was lower than expected, partly due to the delay by some parties in the finalization of national guidelines and procedures for JI. However, it is estimated that the number of projects that will come to the JISC after final determination by accredited auditors will increase to 50–75 projects per year in 2008–2009 (UNFCCC, 2007b).

Although projects may be developed in any industrialized or EIT country, in practice most of the projects are currently located in Eastern European countries and in the countries of the former Soviet Union. The portfolio illustrates this trend: the majority of the JI projects are being developed in Russia and Ukraine, which had proposed 79 and 23 projects, respectively, as of June 11 2008 (UNEP Risoe Centre, 2008). Bulgaria, Russia and Ukraine accounted for 20% each of the 44MmtCO_2e in ERUs supplied between 2003 and 2006 (Capoor and Ambrosi, 2007).

The buyers, on the other hand, tend to be from Western Europe. Public sector buyers, mainly in the Netherlands, Denmark and Austria, have dominated the JI market in the early years, accounting for 92% of the ERUs transacted in 2006, and 80% in 2004 and 2005 (Capoor and Ambrosi, 2007). However, in 2007 private sector buyers, notably from Japan, made purchases in Eastern Europe. In 2007, 41MmtCO_2e in ERUs, worth USD 499 million, was transacted (Capoor and Ambrosi, 2008).

21 It should be noted that projects at the determination stage may actually be undergoing various steps. While some may be awaiting approvals from the host country's national authority, others may have received a negative determination by the independent auditor accredited to determine JI projects. A breakdown of these various stages is not available and therefore the projects have been grouped together under the determination stage.

Offset project eligibility

Project types

The project types eligible or ineligible under JI are the same as those under the CDM. The only difference is that while only afforestation and reforestation LULUCF projects are eligible under the CDM, other LULUCF project types, including forest management, cropland management and grazing management, are eligible under JI (UNFCCC, n.d.e).

Project locations

A JI project can be located in any industrialized or EIT country that has ratified the Kyoto Protocol and has GHG emission limitations under the treaty.

Project size

There are only specific project size limitations for small-scale renewable energy projects with a maximum output capacity of 15 MW (UNFCCC, 2007c).

Start date

The project start date for eligibility is January 1 2000.

Crediting period

The crediting period for a JI project must begin after January 1 2008 and end in 2012. However, the length of the crediting period can be extended beyond 2012 up to the operational life of the project if it is approved by the JI DFP in the country hosting the project (UNFCCC, n.d.f).

Co-benefit objectives and requirements

Like the CDM, there are no explicit guidelines on the environmental or social co-benefits of JI projects. Unlike the CDM, JI projects are not required to assist countries with achieving their sustainable development goals, and projects do not have to be assessed based on any sustainable development criteria (UNFCCC, 1997).

Additionality and quantification procedures

Additionality requirements

Like the CDM, every JI project must demonstrate that without JI, either the project would not have gone ahead, or it would have used an inferior technology resulting in higher GHG emissions. A JI project can demonstrate additionality in one of the following ways:

- using an approved CDM baseline and monitoring methodology;
- applying the most recent version of the 'Tool for the demonstration and assessment of additionality' or any other method approved by the CDM EB;
- providing traceable and transparent information showing that the project's baseline was identified on the basis of conservative assumptions, that the project

scenario is not part of the identified baseline scenario and that the project will lead to reductions in anthropogenic emissions or enhancements of net removals; or by

- providing traceable and transparent information on a previously 'successfully determined' comparable project implemented under comparable circumstances, and justifying why it is relevant to the proposed project under consideration.

Quantification protocols

The basic principles and the processes that apply in the quantification of emission reductions in CDM projects are the same for JI projects.

Project approval process

Validation and registration

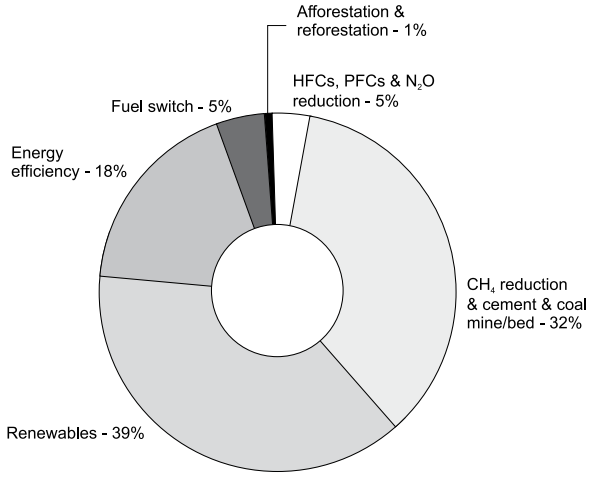
Under JI, the validation stage is referred to as the determination. The determination of a JI project is carried out by an independent auditor (an Accredited Independent Entity, AIE) accredited by the JISC. There are no accredited auditors under the JI program as yet, so the CDM auditors (DOEs) are serving as provisional auditors for determining JI projects. The acceptance of the auditor's determination report by the JISC, referred to as final determination, is similar to the registration of the project under the CDM. This is only required for Track 2 projects as Track 1 projects are not assessed by the JISC.

Like the CDM, the project developers have to develop a project design document, which the AIE reviews to confirm that the project is eligible, additional and compliant with national laws and environmental requirements. The AIE also solicits public comments through the UNFCCC and then prepares a Final Determination Report, which is made public through the JISC. Like the CDM registration process, unless a party involved in the project or three members of the JISC request a review of the project, the AIE's determination report is accepted and the project secures a final determination from the JISC. If a review is requested, the JISC must make a final decision no later than six months or at its second meeting after the review was requested.

Monitoring, Verification and Certification

The monitoring and verification processes for JI projects under its Track 2 procedure are similar to that of the CDM projects. It requires the preparation of a Monitoring Report by the project developer, verification with possible site visits and the preparation of a Verification Report by the accredited auditor. Both the documents are made public through the UNFCCC secretariat. If the JISC is not asked to review the auditor's verification, then the assessment is made final and the project host country can issue ERUs equivalent to the amount of emission reductions approved by the JISC. The ERUs are converted from Assigned Amount Units (AAUs) or from Removal Units (RMUs, from LULUCF activities). There is no certification procedure for JI projects.

Percentage of projects in each category



ERUs until 2012 (%) in each category

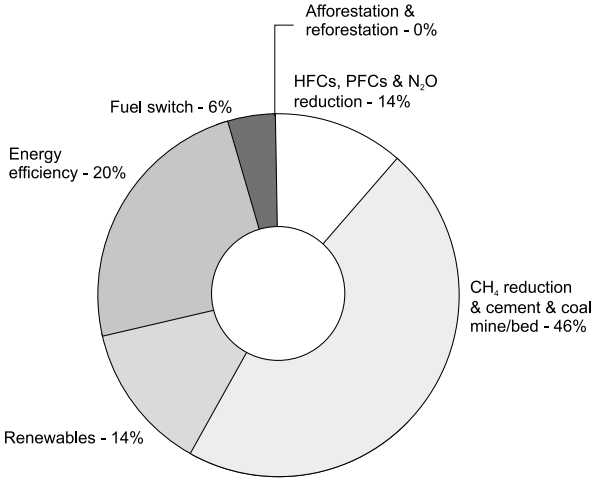


Figure 4.3: Distribution of JI projects and ERUs by project type
Source: UNEP Risoe Centre 2008

Registries and fees

There is no JI registry. ERUs are issued to the national registries of the industrialized and EIT countries hosting the projects. ERUs may be transferred from one national registry to another if the ERUs are purchased by an entity authorized by an industrialized or EIT country DFP. The JI fee structure is as follows.

- Independent auditors applying for JI accreditation are required to pay a one-time non-reimbursable fee of USD 15,000 in addition to any direct costs incurred by the team assessing its application.

- A progressive fee based on the volume of emission reduction or removal is charged for processing verification reports. The fee is USD 0.10 per metric ton of CO_2e for the first 15,000 units generated in a year, and USD 0.20 for each additional unit.

- The fee is charged as an advance at the time of applying for final determination by the JISC. The advance is adjusted against actual payments due at the time of verification. Small-scale projects with emission reductions of less than 15,000 tCO_2e are exempted from paying in advance but are required to pay the fee at the time of verification.

- Up to USD 30,000 of the amount paid in advance is non-reimbursable if the project does not secure a final determination by the JISC.

Selected issues

JI projects face risks similar to those faced by CDM projects. These relate to the uncertainties surrounding: the national approval, validation and registration processes; technical failure; and the demand for JI credits post-2012 (Carnes *et al*, 2007). The JI status of some countries is still unclear, and in these countries the implementation rules either have not been fully agreed, or have been agreed but not yet implemented or communicated sufficiently (Van de Ven, 2007).

Another issue with JI is double counting. For example, if the JI reduction happens in an installation under the EU ETS and no account is given for these reductions, the operator can sell the *EU ETS* allowances (EUAs) that were avoided through the JI project as well. As a result, the government could potentially hand out two credits (1 ERU and 1 EUA) for a reduction of just one ton of CO_2. This issue is addressed in the double counting guidelines of the linking directive[22], which states that projects at installations covered by the EU ETS cannot be put forward as JI projects because the allocation of EUAs and the generation ERUs in the same installation would lead to double counting. Some, however, argue that the restrictions on the eligibility of JI projects imposed by the double counting guidelines and the need to comply with other

22 The „linking directive" is the EU directive that permits companies covered under the EU-ETS to use CDM and JI carbon credits to meet their emission reduction obligations.

EU laws in setting the baselines restrict wind and hydropower projects, and that the double counting guidelines should be relaxed for renewable energy projects (Van de Ven, 2007).

Other issues highlighted include: the lack of reliable data to establish baselines; concern on the part of project developers that what they realize or sell now will be cut later when cap-and-trade programs are established/expanded; and unclear rules and processes for host nation approval, which makes getting project approval more uncertain. Proposed solutions to these problems include the creation of an *ex ante* 'white list' of project types for host nation approval, making decision-making processes more transparent with the right to appeal decisions and taking steps to limit the sovereign risk associated with the issuance and transfer of ERUs (Van de Ven, 2007).

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5 MANDATORY CAP AND TRADE SYSTEMS (OFFSET FEATURES)

Mandatory cap and trade systems require entities in sectors regulated under the cap to account for their emissions, and then to achieve compliance with emission cap requirements through a combination of mechanisms including internal emission reductions, trade and purchase of emission allowances and/or purchase of offsets.

This section describes in more detail the offset features of five mandatory cap and trade systems:

- Australian Carbon Pollution Reduction Scheme;
- Canada's Offset System for Greenhouse Gases;
- New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS);
- Regional Greenhous Gas Initiative (RGGI);
- Western Climate Initiative (WCI).

5.1 Australian Carbon Pollution Reduction Scheme

http://www.greenhouse.gov.au/emissionstrading/index.html

Overview

Type of System/Program and Context

The Australian Government is in the process of developing a national emission trading scheme, which is due to start no later than 2010 (Australian Government, 2008). Although the detailed program design is not expected to be finalized before the end of 2008, some elements have begun to emerge. The national emission trading scheme is expected to be a mandatory compliance program based on a cap and trade system. Both the *Report of the Task Group on Emissions Trading* and the recent *Garnaut Climate Change Review: Interim Report* have explicitly recommended the use of domestic and international offsets as a cost-efficient compliance mechanism under the proposed emission trading scheme (Australian Government, 2007; Garnaut, 2008). Additional details regarding the proposed design of the Australian scheme are available in the *Carbon Pollution Reduction Scheme Green Paper* published in July 2008.[23] Due to the timing of its release, the discussion below is based on earlier reports.

Program authority and administrative bodies

Under development.

23 The Green Paper is available at http://www.greenhouse.gov.au/greenpaper/index.html.

Regional scope
Early discussions focused on developing a domestic emission trading scheme limited to Australia. However, in February 2008 Australia and New Zealand[24] announced that they were examining ways to develop a linked scheme (Point Carbon, 2008).

Recognition of other standards/ linkage with other trading systems
Linking the Australian emission trading scheme to other national and regional schemes in order to "provide the building blocks of a truly global emissions trading scheme" is a key consideration in the development of the proposed scheme (Australian Government, 2007).

Market size and scope
Tradable unit and pricing information
Offset credits will be measured in units of metric tons of CO_2e. Pricing information is not applicable.

Participants/buyers
Under the proposed cap and trade scheme, regulated facilities will include direct emissions from large facilities and upstream fuel suppliers (Australian Government, 2007). Offsets have been recommended as an approved compliance mechanism for the facilities regulated under the cap and trade system (Australian Government, 2008).

Current project portfolio
Not applicable.

Offset project eligibility
Project types
Offset credits generated from land use, forestry, wood production, avoided deforestation and carbon geosequestration projects have been identified as priorities under the proposed national emissions trading scheme (Australian Government, 2007).

Project locations
Both domestic and international offsets are being considered in the proposed national emissions trading scheme and limitations on international locations, if any, are yet to be defined (Australian Government, 2008).

Project size
Under development.

Start date
Under development.

24 New Zealand introduced its domestic cap and trade scheme on January 1 2008. Forestry was the only sector covered in the first year (Point Carbon, 2008a).

Crediting period
Under development.

Co-benefit objectives and requirements
Under development.

Additionality and quantification procedures
Additionality requirements
Under development.

Quantification protocols
Under development.

Project approval process
Validation and Registration
Under development.

Monitoring, verification and certification
Under development.

Registries and fees
Under development.

Selected issues
Because Australia's Program is still in the process of being developed, there are no lessons to be learned to date.

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5.2 Canada's Offset System for Greenhouse Gases

http://www.ec.gc.ca/doc/virage-corner/2008-03/526_eng.htm

Overview

Type of system/program and context

Canada has a goal of reducing its overall GHG emissions by 20% by 2020. Canada's Offset System for Greenhouse Gases will serve as a compliance mechanism for industrial facilities whose GHG emissions intensity will be regulated under the Government of Canada's proposed Regulatory Framework for Air Emissions. The Regulatory Framework proposed in 2007 is expected to come into force on January 1 2010. It will set mandatory emissions intensity reduction targets relative to 2006 levels, starting with an 18% reduction in 2010 and increasing each year by 2% – achieving a 33% emissions intensity reduction by 2020 (Environment Canada, 2008a).

All Canadian industrial facilities,[25] with the exclusion of very small facilities, will be regulated and required to meet emissions intensity reduction targets. The targets will use baselines set at three different levels – facility, sector-wide or corporate – which will depend on the sector.[26] These targets will create the primary demand for offsets generated from activities not covered under the Regulatory Framework. There is no limit on the use of offsets by a regulated facility for compliance.

Program authority and administrative bodies

The Offset System will be administered by Environment Canada, the Government of Canada's Department of Environment.

Regional scope

Only GHG reductions or removals achieved in Canada are eligible for generating offsets under Canada's Offset System for Greenhouse Gases.

Recognition of other standards/ linkage with other trading systems

Regulated facilities under the Regulatory Framework will be able to meet up to 10% of their emission reduction obligations through the purchase of Clean Development Mechanism (CDM) Certified Emission Reductions (CERs) (excluding bio-sequestration projects) (Environment Canada, 2008a).

Initially, emission trading under the Regulatory Framework will be restricted to Canada. The Government of Canada has indicated its intention to move from emissions intensity targets to fixed emission caps in the 2020–2025 period (Environment Canada, 2008a).

25 Environment Canada informed the authors of this report that the size limit for entities covered by the regulations is currently under consideration. Furthermore, whether 'very small facilities' in a regulated sector can apply for offsets is also currently under consideration by Environment Canada.

26 Sector-wide emissions intensity baselines will be used for facilities in the lime, pulp and paper, aluminum and alumina, and cement sectors. Corporate-wide emissions intensity baselines will be used for firms in the electricity sector that own a number of facilities. Facility-specific targets will be applied to facilities in the iron ore pelletizing, potash, base metal smelting, chemicals, fertilizers, iron and steel, ilmenite (titanium), oil sands, petroleum refining, natural gas pipelines, and upstream oil and gas sectors.

When it does so, it will take into account developments in other countries, especially the US, with the aim of establishing a North American trading system. Such linkages, if established, are also expected to include the transfer of offset credits generated under Canada's Offset System for Greenhouse Gases.

Market size and scope

Tradable unit and pricing information

The tradable unit will be referred to as an "Offset Credit", which is equivalent to one metric ton of CO_2e emissions reduced or removed (Environment Canada, 2008b). No pricing information is currently available as the program is yet to enter into force.

Participants/buyers

Sellers in the GHG Offset System can be any legal entity developing an eligible offset project activity. Buyers may include facilities complying with their emissions intensity reduction targets under the Regulatory Framework, or any other entities purchasing the credits voluntarily for trading or for compliance under other regulatory systems. Other participants in the GHG Offset System may include technical service providers, third-party verifiers, aggregators and traders.

Current project portfolio

There are currently no offset projects as the scheme is not yet in force.

Offset project eligibility

Project types

Initially, only project types with an Offset System Quantification Protocol pre-approved by Environment Canada will be eligible (Environment Canada, 2008b). Later, the system will promote project types in all sectors if they lead to the abatement of one of the six Kyoto GHGs. Potentially eligible project types include:

- carbon capture and storage;
- energy efficiency and demand-side management;
- electricity and heat (renewable electricity, capture and flare or use of landfill gas, and capture and flare or use of methane generated from livestock waste);
- transportation (modal shifts, fleet conversion to hybrid, reduced idling technologies, hydrogen fuel injection);
- biofuels;
- agriculture (tillage practices, nutrient management, innovative feeding of livestock, manure storage/spreading); and
- forestry (afforestation, reforestation, forest management and avoided deforestation).

Project locations

Offset projects must result in GHG emission reductions or removals in Canada (Environment Canada, 2008b) with the exception of up to 10% of the required emission reductions, which can be covered through the purchase of CERs.

Project size

There are no limitations on project size. Smaller projects may be aggregated or bundled together if they are similar in type or in their effect, for example, on fuel consumption.

Start date

Projects that started on or after January 1 2000 are eligible. However, credits may only be issued for reductions achieved after January 1 2008 (for exceptions, see below) (Environment Canada, 2008b).

Crediting period

Once registered, an offset project can generate offset credits. Under specific circumstances,[27] Environment Canada may issue credits for reductions achieved before the registration date. The registration and crediting period for an offset project is eight years from the project's baseline year, which is either the project's commissioning year or its registration year (Environment Canada, 2008b).

Registration and crediting periods may be renewed once after the first period of eight years with the following restrictions: the baseline must shift to the year the project is re-registered and the registration periods must be contiguous. Biological sequestration projects in the agriculture and forestry sectors can apply for re-registration more than once.

Co-benefit objectives and requirements

Offset projects have to comply with existing environmental regulations but do not have to have additional co-benefits. Projects may also be required to identify and address the negative impacts of other air pollutant emissions.

Additionality and quantification procedures

Additionality requirements

Emission reductions or removals from an offset project must be in surplus to all legal requirements[28] at the federal, provincial/territorial and regional levels. If these vary significantly across the country, then Environment Canada may specify the use of a normalized baseline to ensure that project proponents in jurisdictions that have been more proactive in regulating GHG reductions are not disadvantaged, and that it does not create a disincentive to further regulation.

27 Includes projects that began prior to the start of the GHG Offset System, or if started before a quantification protocol was developed provided an application is submitted within six months of quantification protocol publication.

28 Legal requirements must have a clear target and a date by which they must be satisfied.

Quantification protocols

The quantification requirements presented in the most recent draft guide for protocol developers, from August 2008, are based on the framework and principles of International Organization for Standardization (ISO) standard 14064 (Environment Canada, 2008c). Following a period of public comment and review, the final version of the guide for protocol developers will be published in the fall of 2008 (Environment Canada, 2008c). A top-down approach is outlined in the draft guide which requires all projects to use quantification protocols that are pre-approved by Environment Canada. Project developers may choose from a range of approaches for baseline quantification, including a historic benchmark, a performance standard, and comparison-based, projection-based, pre-registered and normalized baselines; or they may propose another approach. Project developers must provide justification for the baseline approach used in the Base Protocol Plan they submit for review to Environment Canada.

Project approval process

Validation and registration

Validation is the first step of the project registration process under the Canada's Offset System for Greenhouse Gases (Environment Canada, 2008c). Project developers must submit an initial Base Protocol Plan to Environment Canada for feedback. Subsequently, project developers submit a complete project proposal, referred to as a Base Protocol Plan, to Environment Canada. With further input from technical review by experts, Environment Canada makes a final decision regarding the inclusion or exclusion of the proposed project. Once included, project developers submit an Offset System Quantification Protocol to Environment Canada and, once approved, the project is registered. Both the Base Protocol Plan and the Offset System Quantification Protocol are posted on the Offset System website by Environment Canada.

Monitoring, verification and certification

Environment Canada is in the process of developing detailed monitoring, verification and certification requirements, which will be published in a series of guidance documents in late 2008 (Environment Canada, 2008b). Ideas under consideration for these processes are outlined here. For monitoring and verification, project developers will have to prepare a Reduction/Removal Report at the end of the calendar year after registration or when 100,000 metric tons of GHG reductions have been achieved, whichever is earlier, and thereafter at a minimum of five-year intervals. The Reduction/Removal Report reports on the GHG reductions or removals claimed by the project developer. Additionally, the project developer must have a recognized verifier provide a Verification Report to Environment Canada. Environment Canada will review both the Reduction/Removal Report and the Verification Report. Once Environment Canada certifies that all the requirements for the issuance of credits have been met, it will authorize the deposit of offset credits (Environment Canada, 2008b).

Two types of credits have been considered for biological sequestration projects to address the risk of non-permanence. The first type – where the project proponent has an obligation to address any reversals of a sequestration project for a fixed period of time,

as yet unspecified, known as a 'liability period' – is as an offset credit (Environment Canada, 2008b). At the end of the 'liability period' the project proponent would no longer have an obligation to maintain carbon storage (Environment Canada, 2008b). The second type is where a temporary credit is issued that represents one metric ton of CO_2 sequestered and stored for one year (Environment Canada, 2008b). Temporary credits would be non-fungible with offset credits and would be tracked separately (Environment Canada, 2008b) .

Registries and fees

A "unit tracking system" will be established to track all credits from issuance to retirement or cancellation.

The Offset System is expected to operate on a cost-recovery basis. Fees will be charged for registration and certification, and to cover the cost of operating the unit tracking system. Fees will not be charged at the outset of the program to facilitate a quicker start to the Offset System. The fee structure is currently under development.

Selected issues

Because Canada's GHG Program is still in the process of being developed, there are no lessons to be learned to date.

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5.3 New South Wales Greenhouse Gas Abatement Scheme

http://www.greenhousegas.nsw.gov.au/

Overview

Type of System/Program and Context

The New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS) is a mandatory emission trading scheme for the state's electricity sector. It was established by the NSW Parliament through the Electricity Supply Act 1995 and started on January 1 2003. On January 1 2005, the Australian Capital Territory[29] (ACT) also introduced a Greenhouse Gas Reduction Scheme that mirrors the NSW GGAS.

The NSW GGAS establishes an annual state-wide per capita GHG emission target, a "benchmark", for the electricity sector. It was initially set at 8.65 metric tCO_2e per capita and then reduced to 7.27 tCO_2e per capita in 2007 in order to achieve the global target set in the Kyoto Protocol[30] of reducing overall GHG emissions to 5% below the baseline year (1990) emissions (NSW GGAS, n.d.).

The regulated entities (called "benchmark participants"), which include electricity retailers, generators and customers, must meet their own emissions targets. Targets are based on an entity's share of electricity sales (or use) multiplied by the overall regional electricity emissions benchmark, that is, the per capita emissions benchmark described above multiplied by the region's population for that year (IPART, 2007). The regulated entities can meet their emission reduction targets by directly reducing the average emissions intensity of the electricity they supply or use, by purchasing tradable abatement certificates called NSW GHG Abatement Certificates (NGAC) and surrendering them to the compliance regulator, or by purchasing Renewable Energy Credits (RECs). A penalty is imposed if participants fail to meet their targets. The current rate is USD10.7 (AUD 12) per $mtCO_2e$.

Program authority and administrative bodies

The Independent Pricing and Regulatory Tribunal of New South Wales (IPART) serves as both the scheme administrator and the compliance regulator, although the two functions are managed separately.[31] As the scheme administrator, IPART's role includes the management of applications for project accreditation and the approval of Abatement Certificate Providers (ACP). ACPs are the offset project developers. As a compliance regulator, it also has the authority to enforce the obligations of the scheme's participants. All audits under the GGAS are required to be performed by specialized auditors appointed to the Audit and Technical Services Panel.

29 The Australian Capital Territory (ACT) is the capital territory of the Commonwealth of Australia, and is its smallest self-governing internal territory. It is an inland enclave in New South Wales.

30 Australia ratified the Kyoto Protocol in 2007. The emissions reduction target for Australia under Kyoto is to 9% above 1990 levels.

31 In the ACT GGAS, IPART has been appointed as the scheme administrator but the compliance regulation function is performed by the ACT's Independent Competition and Regulatory Commission (ICRC).

Regional scope

NSW GGAS and ACT GGAS regulate the emissions of the electricity sector within the Australian state of New South Wales and the ACT, respectively. Projects that create abatement certificates (NGACs) are also required to be located in NSW or the ACT, unless they are power generation projects connected to the power grid covering the Australian eastern seaboard.

Recognition of other standards/ linkage with other trading systems

The experiences gained in establishing and administering the NSW GGAS have been used in the development of the Australian emission trading scheme. In 2005, the NSW Government passed legislation extending the GGAS scheme to 2020 or until a national trading scheme was introduced. The Australian GHG Emissions Trading Scheme is currently being designed and a green paper detailing the various elements of the scheme was released in July 2008 (see 5.1, Australian Carbon Pollution Reduction Scheme). The design phase of the scheme is expected to last through to the end of 2008 and the first compliance year is expected to start on July 1 2010. It is currently unclear how the NSW GGAS will be incorporated into or otherwise affected by the development of the scheme.

Market size and scope

Tradable unit and pricing information

NSW GHG Abatement Certificates (NGACs) are the tradable units in the NSW/ACT GGAS and represent the abatement of one metric ton of CO_2e emissions.

The maximum price for NGACs on the open market is the effective cost of non-compliance, currently set at AUD 12 per $mtCO_2e$ (NSW GGAS, 2007). As of September 2007, the spot market price had dropped from the June 2007 price of USD 10.4 (AUD 11.65) per NGAC to USD 4 (AUD 4.75) (Tradition Financial Services, 2007; Capoor and Ambrosi, 2008).

The market for NGACs under the GGAS has been characterized as "fairly illiquid, with typically more selling interest than buying" (Tradition Financial Services, 2007). In the initial years of the scheme's operation, demand exceeded supply and the price of NGACs was stable in a range just below the penalty-equivalent price. Following this initial period, a predictably short supply accelerated the take up of viable abatement opportunities With the announcement of a national cap and trade emission trading scheme in June 2007, uncertainty over the future of NSW GGAS substantially dampened the demand for NGACs. This corresponded with a period of large supply in the market, primarily from programmatic energy efficiency projects involving the distribution or installation of energy efficient light bulbs or compact fluorescent lamps (CFLs).

As of June 30 2007, the supply of offset credits exceeded demand, but this trend is expected to shift in the future. There are projections of a peak in the supply of offset credits in 2007 due to the continuing implementation of CFL projects. Supply is

projected to decrease as these projects decline significantly after 2009, when the sale of incandescent light bulbs is banned in Australia.

Demand for NGACs is expected to rise throughout 2009 as a result of the lowering of the state's GHG benchmark, the elimination of the benchmark shortfall allowance and an expected increase in the average emissions intensity of electricity production. However, the treatment of NGACs and the future of compliance obligations under an Australian emission trading scheme is a significant source of uncertainty in the market.

Participants/buyers

The NSW GGAS and the ACT GGAS have both mandatory and voluntary participants. Mandatory participants include electricity retailers, electricity generators that supply directly to retail customers, and market customers with a market load supplied directly from the National Electricity Market (NEM). Voluntary participants include large electricity customers and state development projects designated by the Minister of Planning to manage their own GHG targets as elective benchmark participants.[32]

Current project portfolio

A total of 209 offset projects have been accredited by the NSW GGAS, including 10 projects accredited between March and May 2008 (NSW GGAS, 2008).[33] The NSW GGAS reported that since the scheme began in 2003, the offset credits generated to May 31 2008 have amounted to over 68MmtCO_2e (NSW GGAS, 2008). Table 5.1 provides information on offset credits generated by project type.

Table 5.1: Offset credits created in the NSW GGAS as of May 31 2008, by project type

Offset project type	Cumulative offset credits (NGACs) created since 2003 (each equivalent to one mtCO_2e)
Generation	41.9 million
Demand-Side Abatement	22.4 million
Large-User Abatement	2.0 million (including RECs)
Carbon Sequestration	1.9 million

Source: NSW GGAS, 2008

32 Eligible customers must have electricity loads greater than 100 GWh with at least one site that consumes 50 GWh annually. As of June 2008, there were 13 voluntary benchmark participants, but no state development projects have been designated by the Minister of Planning (Fowler, R., e-personal communication, June 9 2008).

33 Information on the current project portfolio changes rapidly. For the latest Scheme Newsletter and project portfolio information see http://www.greenhousegas.nsw.gov.au/Documents/syn96.asp.

Offset project eligibility

Project types

The GGAS allows for the creation of offset credits by Abatement Certificate Providers (ACPs) for activities in one or more of the four offset project types outlined in the Greenhouse Gas Abatement Rules (IPART, 2007):

- *Electricity Generation*: covers low-emission generation of electricity including cogeneration and renewable energy production, or improvements in the emissions intensity of existing generation activities.[34]

- *Demand Side Abatement:* covers activities that result in reduced consumption of electricity in residential, commercial or industrial settings.[35]

- *Large User Abatement*: covers activities carried out by elective participants to reduce on-site emissions not directly related to electricity consumption.[36] Project examples include increasing the efficiency of on-site fuel use; switching to lower emissions intensity fuels; the abatement of on-site GHG emissions from industrial processes; and the abatement of on-site fugitive GHG emissions.

- *Carbon Sequestration*:[37] Eligible projects must meet all of the eligibility requirements listed below. Projects must:

    - qualify as either an afforestation or reforestation project as defined by the United Nations Framework Convention on Climate Change (UNFCCC);
    - take place in NSW;
    - own or control the Carbon Sequestration Rights for the land;
    - demonstrate that the carbon sequestration achieved will be maintained for at least 100 years;
    - provide documentation that appropriate procedures are in place to manage risks of carbon loss, such as fire, disease or climate variability; and
    - maintain adequate records of carbon storage.

Project locations

For the certification of offset projects, activities must meet the location criteria outlined in the Greenhouse Gas Abatement Rules. Generation offset projects can be located at any generating system connected to the electricity grid spanning the Australian eastern

34 See Greenhouse Gas Benchmark Rule (Generation) No. 2 of 2003 for details. Available at: http://www.greenhousegas.nsw.gov.au/documents/FS-Gen-Certs-01.pdf.

35 See Greenhouse Gas Benchmark Rule (Demand Side Abatement) No.3 of 2003 for details. Available at: http://www.greenhousegas.nsw.gov.au/documents/FS-DSA-Certs-02.pdf.

36 See Greenhouse Gas Benchmark Rule (Large User Abatement Certificates) No. 4 of 2003 for details. Available at: http://www.greenhousegas.nsw.gov.au/documents/FS-LUAC-Certs-01.pdf.

37 See Greenhouse Gas Benchmark Rule (Carbon Sequestration) No. 5 of 2003 for details. Available at: http://www.greenhousegas.nsw.gov.au/documents/FS-CS-Certs-01.pdf.

seaboard, in line with the boundaries of the National Electricity Market (NEM)[38]. Demand-side abatement, large-user abatement and carbon sequestration offset projects are required to be implemented in NSW.

Project size

There are no project size restrictions for demand-side management, large-user on-site reduction or electricity generation projects. Carbon sequestration projects are required to meet the size requirements established by the definition of a forest in Australia and to be consistent with Kyoto Protocol guidelines.[39]

Start date

Electricity generation project types are required to have been implemented after January 1 2003. Demand-side management projects are required to have been implemented after January 1 2002 in NSW or after January 1 2004 in the ACT. Carbon sequestration projects are required to take place on land that was predominantly non-forest prior to January 1 1990. In addition, the increases in carbon stocks are only recognized after January 1 2003 and the projects must provide continued carbon storage for at least 100 years.

Crediting period

No explicit crediting period was established under the NSW GGAS as it was always intended to be a transitional arrangement.

Co-benefit objectives and requirements

There are no co-benefit requirements for offset project eligibility.

Additionality and quantification procedures

Additionality requirements

The NSW GGAS addresses additionality by using a performance standard approach – through the development of a positive technology project list and by establishing baseline scenarios for each project and technology type.

Quantification protocols

The NSW GGAS uses a top-down approach for baseline quantification. The Greenhouse Gas Benchmark Rules provide rules for calculating baseline emission rates for each type of eligible offset project.

For electricity generation abatement activities, the baseline is calculated using a variety of methods that depend on whether the generator is new or existing, fossil fuel based, and/ or covered by a prior NSW voluntary benchmark system. In general, the

38 The Australian electricity industry was restructured in the 1990s. Separate commercial structures have been developed for the monopoly transmission and distribution functions as well as generation and retailing. It was at that time that NEM was established (www.nemmco.com.au).

39 Forests must be at least 0.2 ha, have 20% crown cover, and have a 2m height capacity of the tree species.

baseline is set either relative to the regional benchmark intensity indicated above or to the facility's prior emission rate.

To accommodate the variability among projects, four different methods are used to calculate the baselines for demand-side abatement activities.

For large-user abatement activities, the baseline is expressed in $mtCO_2e$ per unit of industrial output.

For carbon sequestration activities, the credits generated are calculated based on the change in carbon stocks over a defined time period. NSW GGAS outlines specific criteria and procedures to ensure the permanence of offset credits generated from carbon sequestration projects. Forest managers are require to conduct an uncertainty analysis and demonstrate that a 70% probability exists that the actual net increase in the carbon stocks is greater than the number of offset credits created. They are also required to conduct periodic monitoring of the forest to verify carbon storage. If carbon stocks fall below the number of offset credits granted, then forest managers are required to inform the scheme administrator (IPART) and to discontinue registration of additional offset credits. IPART can also decide that the project developer (the ACP) needs to purchase offset credits from the open market to account for the shortfall in carbon stocks.

Project approval process

Validation and registration

The regulations governing the NSW GGAS do not prescribe a specific validation approach. The scheme administrator (IPART) has established a risk-based approach to determining whether the eligibility of or the abatement from an offset project must be audited by a third party. The higher the risk is determined to be, the more likely it is that IPART will require a third-party audit. IPART also decides the frequency and scope of such an audit. The risk assessment is based on the participant's compliance history, the complexity of the offset project, the number of projects that share a common process and additional relevant factors. In some cases, where the risk is considered to be very low, the scheme administrator may not require an audit prior to accreditation of the project. In practice, a majority of the projects are required to be audited.

NSW GGAS is different from other offset programs in that the project developers (ACPs) actually create their own credits on the NSW GGAS Registry. This process is monitored by the scheme administrator and periodically audited to ensure ongoing compliance with procedures.

Monitoring, verification and certification

Projects are required to report their status and the emissions abated every year. The offset credits generated are required to be verified to demonstrate ongoing compliance with the NSW GGAS, and the frequency of the verification is determined by the scheme's administrator. The reporting requirements for monitoring the compliance of

offset credits are outlined in the Guide to Record Keeping for Abatement Certificate Providers.[40]

Qualifying reductions from electricity generation, demand-side abatement and large-user offset projects are calculated on an annual basis and credited as offset credits throughout the duration of the project.

Registries and fees

The NSW GGAS Registry was commissioned by IPART, and is operated and maintained by LogicaCMG, an IT and business services company. Offset credits are registered on the online registry for a fee of USD 0.13 (AUD 0.15) per certificate. Change in ownership is recorded in the registry, but the registry does not serve as a platform for offset credit trading. The buying and selling of offset credits is done on the open market.

Selected issues

Several examples of best practice in the NSW GGAS offset program scheme design were identified in a 2007 report by Abatement Solutions – Asia Pacific (AP-AC, 2007). They include the following:

- The NSW GGAS has a strong legal basis, which allows the scheme's administrator (IPART) to use enforcement mechanisms to create a strong culture of compliance among the program participants.

- The NSW GGAS reduces the administrative burden for smaller projects by using a risk-based approach to determining auditing frequency and flexibility of unit creation (see 5.3.5 Project Approval Process), as well as using a tiered approach for compliance and performance monitoring requirements.

- The NSW GGAS has enhanced the consistency and ease of project assessment and project applications by developing a set of document templates for project assessment and application guidelines for each project type.

Concerns about the effectiveness, efficiency and equity of the NSW GGAS were raised in a report prepared by the Center for Energy and Environmental Markets in 2007 (CEEM, 2007):

- The lack of any required assessment of additionality in the validation process of offset credits is a primary criticism. The report cites several examples of the generation of offset credits from pre-existing power generation facilities. This claim is corroborated by the Australian Government's estimate that the additional abatement driven by the NSW GGAS in 2010 will be only 5M $mtCO_2e$ and not the 20M $mtCO_2e$ claimed by IPART.

40 Available at http://www.greenhousegas.nsw.gov.au/documents/GtRK-ACP.pdf.

- The NSW GGAS may delay meaningful action to reduce GHGs at the state and national levels because the scheme creates a perception that emissions are already being reduced, and firms that base their business plans on it are likely to actively oppose any later changes in scheme design.

- A conflict of interest exists by having both the scheme administrator and compliance regulator responsibilities managed by IPART.

- There is concern about the transparency of the reporting process due to the lack of publicly available data and information on the methodology or the equation used, on how the baselines were calculated and on how compliance is achieved.

- The diversity of project types and providers is low. Most of the offset credits from 2003–2005 came from only a few project types.

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5.4 Regional Greenhouse Gas Initiative

http://www.rggi.org/

Overview

Type of system/program and context

The Regional Greenhouse Gas Initiative (RGGI) is a multi-state mandatory cap and trade program to reduce CO_2 emission from electricity generation. It was established in 2005 by governors of seven US states in the Northeast and Mid-Atlantic regions and has since expanded to include 10 states.

RGGI will begin in 2009 as the first mandatory cap and trade program to regulate GHGs in the US. Its objective is to reduce CO_2 emission in the regulated energy sector by 10% from 2009 to 2018. It will start by setting a regional cap to stabilize emissions from 2009 to 2014 and then reduce the cap by 2.5% each year until 2018. The first auction of allowances was held in September 2008. All the allowances were sold at a price above the auction reserve price.

Offsets will serve as a limited alternative compliance mechanism for regulated facilities under the RGGI program. The program has been designed to prioritize emission reductions within the regulated energy sector of RGGI member states. At the start of the program, the regulated facilities will be able to meet 3.3% of their compliance

obligation through the use of offsets. If the emissions allowance prices rise above a specified level, the trigger,[41] a regulated facility can use a higher percentage of offsets to meet its compliance obligation. If the price exceeds USD 7 (stage one),[42] the facility can use offsets to meet up to 5% of its compliance obligation; and if it exceeds USD 10 (stage two), it can use offsets to meet 10% of its obligation.

Program authority and administrative bodies

The program authority for RGGI is distributed among the participating states with each state's environmental regulatory agency serving as the administrative authority in its state. They are responsible for the administrative tasks of monitoring compliance, tracking emissions and allowances, approving offset projects and awarding offset allowances to projects within their state. In cases where the regulated facilities already report their emissions to the US Environmental Protection Agency (EPA), the US EPA will provide administrative support to the RGGI program.

Regional scope

As of July 2008, the RGGI program had 10 participating US states in the Northeast and Mid-Atlantic regions: Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, Vermont, Massachusetts, Rhode Island and Maryland. Additionally, Pennsylvania, District of Columbia and the eastern Canadian provinces of New Brunswick, Ontario, and Quebec were observers in the process and considering participation.

Recognition of other standards/ linkage with other trading systems

When it is launched, in 2009, RGGI will not be linked to any other trading system. If the stage 2 emissions allowance price is exceeded even after increasing the percentage of the compliance obligation that can be met with offsets, regulated facilities will be able to purchase offsets from outside the RGGI region. This would include offsets generated in any other mandatory carbon constraining program outside the US that places a specific tonnage limit on GHG emissions, or GHG emission reduction credits certified pursuant to protocols adopted through the UNFCCC process (RGGI, 2007). This provision provides the opportunity for linkage with both of the project-based mechanisms of the Kyoto Protocol, including offset credits from the CDM and Joint Implementation (JI), and potentially other mandatory programs too.

State staff members involved in the RGGI program are actively engaged in the WCI and Midwestern Regional Greenhouse Gas Reduction Accord processes, supporting these efforts using the experience they have developed through the RGGI program. Links between RGGI and other mandatory programs are seen as a goal, and five RGGI states are members of the International Carbon Action Partnership (ICAP), a

41 The price trigger is evaluated based on long-term price signals. These signals are determined based on a 12-month rolling average price, following a 14-month market settling period, which commences at the start of each new compliance period.

42 Both stage 1 and stage 2 emissions allowance price triggers are based on 2005 USD values.

group of countries and regions that have implemented or are actively pursuing the implementation of carbon markets through mandatory cap and trade systems.

Market size and scope

Tradable unit and pricing information

The tradable units generated from offset projects created under the RGGI program are referred to as 'CO_2 offset allowances' and measured in units of short tons of CO_2e.[43]

Participants/buyers

Regulated facilities under the RGGI program include all fossil fuel-based electric generating units with a capacity greater than 25 megawatts within the boundaries of the 10 current participating US states.

Current project portfolio

RGGI's first three-year compliance period will start in January 2009. The program is expected to cap CO_2 emissions at 188 million short tons to the end of 2014. Although trading of RGGI emission allowances has begun, with the first trade taking place in February 2008, no offset credits have yet been traded under the RGGI program. As the use of offsets for compliance can change with the emission allowance price triggers, it remains to be seen what the future role and size the offset market will be under the RGGI program (Point Carbon, 2008).

Offset project eligibility

Project types

The RGGI program takes a top-down model to assessing the eligibility of offset project types. Currently, only five offset project types are eligible under RGGI:

- landfill methane capture and destruction;
- Sulfur hexafluoride (SF_6) emission reduction;
- carbon sequestration through afforestation activities;
- CO_2 emission reduction or avoidance from natural gas, oil or propane combustion due to end-use energy efficiency in the building sector; and
- avoided methane emissions from agricultural manure management operations.

Detailed methodologies for the above offset project types are included in the RGGI Model Rule, a set of regulations detailing the program. The participating states also intend to develop methodologies for evaluating new offset project types.

43 The RGGI program uses units of short tons in order to be consistent with EPA reporting in the US (C. Sherry, personal communication, New Jersey Department of Environmental Protection, June 25 2008).

Project locations

Currently, eligible offset projects must be located within a RGGI participating state, or any other state or US jurisdiction where a cooperating regulatory agency has entered into a memorandum of understanding (MOU) with a RGGI regulatory agency to provide oversight support for the project. However, if the stage two trigger comes into effect, the geographic project location boundary will be expanded to allow, under certain conditions, offsets from any mandatory carbon constraining program outside the US (see 'Recognition of Other Standards' under 5.4.1 Overview).

Project size

There are no project size requirements for the offset project types currently approved by RGGI.

Start date

Offset projects must have commenced on or after December 20 2005.

Crediting period

The initial crediting period for all offset projects is 10 years. Once approved, it can be renewed for an additional 10 years. For afforestration offset projects, the initial period is 20 years and the renewal period is an additional 20 years, if approved.

Co-benefit objectives and requirements

There a no additional co-benefit objectives or requirements for offset projects under the RGGI program. However, potential co-benefits were one criterion considered in the process of selecting eligible project types under the RGGI program (Sherry, 2008).

Additionality and quantification procedures

Additionality requirements

RGGI takes a standardized approach to evaluating additionality through benchmarks and performance standards. Additionality is evaluated through a combination of general additionality requirements for all eligible offset projects and specific requirements for each project type designed to address project-specific issues. The general requirements specify that CO_2 offset allowances are not awarded to offset projects that:

- are required pursuant to any local, state or federal law, regulation or administrative or judicial order;
- include an electricity generation component, unless the project sponsor transfers the legal rights over all the credits generated by the project in complying with a renewable portfolio standard or other regulatory requirement to the regulatory agency or its agent;
- receive funding or other incentives from any system's benefit fund, through the consumer or through any strategic allocations for energy purposes;

- are awarded credits or allowances under any other mandatory or voluntary GHG program. (RGGI, 2007).

Quantification protocols

Quantification protocols for establishing baselines and monitoring offset projects are based on a top-down approach. Specific quantification protocols for each project type are included in the RGGI Model Rule. The protocols provide detailed guidelines for the determination of emission baselines, the calculation of emissions reduced or sequestered, and for monitoring and verification. There are no guidelines for addressing leakages. The protocols also require that the monitoring and verification plans of all projects be evaluated by an independent accredited verifier. Quantification methodologies for future eligible project types will be developed by state regulatory agencies, but no timelines have been set for the release of additional project protocols.

Specific protocols have been developed to address the issue of permanence in connection with afforestation offset projects. Project developers are required to place the land developed for afforestation projects under a legally binding permanent conservation easement, which requires that the land be managed to maintain long-term carbon density in accordance with environmentally sustainable forestry practices (RGGI, 2007).

Project approval process

Validation and registration

Validation, referred to as 'consistency determination', is the first step of the application process for offset projects under the RGGI program. The project's validation documents have to be reviewed by an accredited independent verifier and then submitted to the appropriate state regulatory agency. The state agency then evaluates and approves or rejects the project.

Monitoring, verification and certification

The submission of an annual monitoring and verification report by the offset project developer to the appropriate regulatory agency is the second step in the application process under the RGGI program. The monitoring and verification reports must demonstrate the precise amount of GHG emissions reduced or sequestered. It must also include a statement demonstrating that it was reviewed by an accredited independent verifier and evaluated by the state regulatory agency to determine whether it can be accepted.

Registries and fees

RGGI is setting up an emissions registry called the RGGI CO_2 Allowance Tracking System, which will be used to track the emissions of all allowance accountholders, the emission reductions of all offset project developers' accounts, and all offset credit transactions. The registry is expected to be developed by the end of 2008. There will be no fees associated with use of the registry but each state may develop a fee structure to cover the administrative costs related to processing offset project applications.

Selected issues

As the first mandatory cap and trade program in the US to regulate GHGs, RGGI is expected to set the stage and serve as the model for future US climate change policy, including the development of the WCI and of potential future programs at the federal level. It has already set precedents for other programs to follow such as the collaboration between energy and environmental agencies in designing the program, and a new approach to allocating allowances by auctioning them (Sherry, 2008).

RGGI is due to begin in 2009, so the expected volume, price, and eligibility of offsets under RGGI are not yet known. Furthermore, since the use of offsets for compliance under the program can increase depending on the price of emission allowances, the role offsets will play over the long-term remains to be seen. Some regulated facilities and investors have expressed concern that the system of price triggers adds additional uncertainty about offset eligibility and compliance requirements (Natsource, 2007). A proposed near-term strategy to moderate market fluctuations includes the states setting a mutual minimum price for allowances.

Reviews of the RGGI program design have presented what are, in some cases, conflicting concerns regarding the challenges of too small or too large an offset market. Limiting the offset project location and type has raised concern that the RGGI offset market may encounter a liquidity problem and present a missed opportunity to use the efficiency of the global markets (Capoor and Ambrosi, 2007). This concern was echoed by the Massachusetts Department of Environmental Protection, which recently decided to expand the offset project location limitations to include international offset projects because insufficient offsets were available for facilities to achieve compliance (MassDEP, n.d.a).[44]

In contrast, others are concerned that the state environmental regulatory agencies lack the administrative capacity to handle the additional workload associated with expanding eligible offset project types. Several interested parties in the region have requested that the eligible project types be expanded. For example, the Forest Guild, a forestry network, recommended that forest management projects be allowed as an offset project type (Point Carbon, 2007b), and the US Department of Agriculture recommended that avoided methane emission from aerobic treatment systems be allowed (USDA, n.d.).

The distributed regional regulatory structure of the RGGI program has also raised concerns that it may become an overwhelming administrative burden for the state environmental regulatory agencies, which may not be evenly distributed if some states have a greater potential for offset project development. The lack of timely and accurate tracking and reporting of emissions experienced in the European Union Emission Trading Scheme and CDM programs, in addition to the inefficiency of the project approval processes, demonstrated that such a distributed regulatory structure

44 Under the original MA power plant rules, offset project locations were limited to the 8 US states (CT, DE, ME, MA, NH, NJ, NY and VT) and their US coastal waters.

can significantly impede investment decisions regarding trading and offset project development (Point Carbon, 2007a; Natsource 2007). RGGI's administrative structure is consistent with the distributed legal structure of each state participating in the program. Regulating the program at the state level is an attempt to reduce barriers to the development of initiatives at a regional level and to enable state governments to willingly participate in the RGGI program.

References

Natsource LLC (2007). *Realizing the Benefits of Greenhouse Gas Offsets: Design Options to Stimulate Project Development and Ensure Environmental Integrity*. National Commission on Energy Policy. January 2007. Available at http://www.energycommission.org/ht/action/GetDocumentAction/i/3178.

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USDA (n.d.). *Comments on Regional Greenhouse Gas Initiative (RGGI) draft model rule.* Available at http://www.rggi.org/docs/usda_ars_florence_sc.pdf

5.5 Western Climate Initiative

http://www.westernclimateinitiative.org/

Overview

Type of system/program and context

The Western Climate Initiative (WCI) is a multi-jurisdictional collaboration that seeks to develop regional strategies to address climate change in North America. As of July 2008, the WCI partners included 11 jurisdictions – Arizona, California, Montana, New Mexico, Oregon, Utah and Washington, in the US; and British Columbia, Manitoba,

Ontario and Quebec in Canada. Other states and provinces in Canada, Mexico and the US have joined as observers.

On August 22 2007, consistent with previously established state and provincial goals, the WCI partners announced its regional goal to collectively reduce emissions to 15% below 2005 levels by 2020. Subsequently, it set up subcommittees to work on various aspects of the regional program including reporting, the scope of the program, the electricity sector, allocations and offsets. In April 2008, the Offsets Subcommittee released its Draft Offsets Design Recommendations on the design, scope and operation of a WCI GHG offset program. Earlier deliberations on major design elements are described below.[45] Finally, just prior to the finalization of this report, the WCI issued its design recommendations and supporting background report, some aspects of which are summarized below.

Program authority and administrative bodies

The WCI partners plan to create a regional administrative organization that will coordinate the regional allowance auctions, track emissions and market activity, coordinate the review and adoption of protocols for offsets, and Coordinate the review and issuance of offset credits, among other tasks.

Regional scope

The WCI partners currently include the 11 jurisdictions in the US and Canada noted above, which encompasses approximately 20% of the population of the US and nearly 75% of the population of Canada.

Recognition of other standards/ linkage with other trading systems

The WCI Partner jurisdictions will seek bilateral and multilateral linkages with other government-approved cap and trade systems in order to make allowances from all participating partner organisations fully fungible.

Market size and scope

Tradable Unit and Pricing Information

N/A

Participants/buyers

N/A

Current project portfolio

N/A

45 For updated information, see the Draft Offset Design Recommendations at http://www.westernclimateinitiative.org/ewebeditpro/items/O104F16589.PDF. The options paper and related documents are also available on the WCI website.

Offset project eligibility

Project Types

The WCI partner's jurisdictions have identified the following list of project types as a priority for investigation and potential participation in the offset program:

- agriculture (soil sequestration and manure management);
- forestry (afforestation/reforestation, forest management, forest preservation/ conservation, forest products); and
- waste management (landfill gas and wastewater management).

Project locations

The WCI partner's jurisdictions may approve, certify and issue offset credits for projects located throughout the United States, Canada and Mexico where such projects are subject to comparably rigorous oversight, validation, verification and enforcement as those located within the WCI jurisdictions. They will not accept offset credits for GHG reductions in developed countries (Annex 1 countries in the UNFCCC) for projects that reduce, remove or avoid emissions from sources that within WCI Partner jurisdictions are covered by the cap and trade program. The WCI partner's jurisdictions may accept offset credits from developing countries through, for example, the Clean Development Mechanism (CDM) of the Kyoto Protocol, and the WCI Partner jurisdictions may establish additional criteria to apply similar rigor to the WCI approved/certified offset projects or other requirements appropriate to enabling the use of these offset credits in the cap and trade program. (WCI, 2008)

Project size

To be determined.

Start date

To be determined.

Crediting period

To be determined.

Co-benefit objectives and requirements

To be determined.

Additionality and quantification procedures

To be determined.

Project approval process

Validation and Registration

To be determined.

Monitoring, verification and certification

To be determined.

Registries and fees

Each of the WCI partners has joined the newly formed GHG registry: The Climate Registry.[46] The Climate Registry will play an important role in establishing an accurate reporting mechanism and an accounting infrastructure on which the WCI cap and trade program could be based.

Selected issues

Because the WCT is still in the process of being developed, there are no lessons to be learned to date.

References

Western Climate Initiative (2008). Western Climate Initiative, http://www.westernclimateinitiative.org/Index.cfm

46 "The Climate Registry is a nonprofit organization that provides meaningful information to reduce greenhouse gas emissions. The Climate Registry establishes consistent, transparent standards throughout North America for businesses and governments to calculate, verify and publicly report their carbon footprints in a single, unified registry" (taken from: www.theclimateregistry.org/about.html).

6 OTHER MANDATORY SYSTEMS (OFFSET FEATURES)

In addition to cap and trade systems, there are other mandatory systems that establish greenhouse gas (GHG) emission reductions targets for regulated entities. Unlike the cap and trade systems, these do not provide for emission allowances to be traded among regulated sources, but they do allow offsets to serve as a compliance mechanism to meet emission reduction requirements.

This section describes the offset features of two mandatory systems:

- Alberta-based offset credit system
- state power plant rules in Oregon, Washington and Massachusetts

6.1 Alberta-Based Offset Credit System

http://www.environment.alberta.ca/1238.html

Overview

Type of system/program and context

Alberta's offset credit system is a compliance mechanism for entities regulated under the province's mandatory GHG emission intensity-based regulatory system. As part of the 2002 Climate Change and Emissions Management Act (CCEMA) and the 2002 Specified Gas Emitters Regulation passed by the Alberta legislature, industries in the energy, chemical and electricity sectors that emit more than 100,000 metric tons of CO_2e of GHGs per year are required to reduce their GHG intensity by 12% per year.[47] These regulations took effect on July 1 2007 and represent the first GHG emissions legislation in Canada. Regulated facilities can meet the emissions intensity reduction target through three compliance mechanisms:

- on-site efficiency improvements;
- contributions to the Climate Change and Emissions Management Fund at a price of USD 15 per metric ton of CO_2e; or
- purchases of Alberta-based offset credits.

47 Emissions intensity, under the Alberta CCEMA regulation is defined as the quantity of GHGs released by a facility per unit of production. The CCEMA regulation has set different emissions intensity reduction targets for established and new emissions sources. For "established" emitters (facilities in operation before January 1 2008) their emissions must be reduced by 12% below their approved baseline emissions intensity (based on the average of the facilities' emissions for the years 2003-2005). For "new" emitters (facilities in operation less than 8 years) the regulation has established reductions at an incremental level of 2% per year beginning in the fourth year of operation (until the full 12% annual reduction level is achieved).

Regulated entities that exceed their emission reduction target can generate offset credits for sale.

Program authority and administrative bodies

The Alberta provincial government has the overall program authority for the Alberta-based offset credit system. Third-party verifiers serve to verify baselines, the offsets and annual compliance reports.[48]

Regional scope

The regional scope of the Alberta offset system is the Canadian province of Alberta.

Recognition of other standards/ linkage with other trading systems

The Alberta offset system encourages linkages with other trading systems to maximize efficiency and resources. It is not currently linked with any other trading systems and it remains unclear how it will be linked to or incorporated into Canada's GHG Offset Program (see section 5.2).

Market size and scope

Tradable unit and pricing information

The tradable units in the Alberta offset system are referred to as 'Alberta-based offset credits' or Verified Emissions Reductions or Removals (VERRs) and are measured in units of metric tons of CO_2e.

Participants/buyers

The Alberta offset system applies to all Alberta industrial facilities in the energy, chemicals and electricity sectors that emit more than 100,000 metric tons of CO_2e of GHGs per year. As of June 2008, the Alberta offset system included close to 100 facilities emitting approximately 115MmtCO_2e per year.

Current project portfolio

According to the first six-month compliance cycle report of the Alberta offset system, 1.5 million verified Alberta-based offset credits had been created, and 1 million of these credits had been retired for compliance by regulated facilities (Rund *et al*., 2008). The credits were generated by eight project developers and nine projects, including four tillage, one biomass and three wind energy projects (Carbon Offset Solutions, 2008).

Offset project eligibility

Project types

The Alberta offset system takes a top-down approach to approving eligible project types. Offset projects are limited to either existing government approved protocols or protocols for new project types approved by Alberta Environment, the provincial

48 Third-party verifiers must submit a Statement of Qualification, which states that the review team has adequate areas of knowledge and expertise (Alberta Environment, 2007a).

environmental regulatory agency. As of July 2008, 23 offset project quantification protocols had been approved and published.[49]

Project locations
All projects are required to be based in the Canadian province of Alberta.

Project size
There are no general restrictions on project size. Specific project size requirements, if any, are included in project protocols.

Start date
Project-based emission reductions or removals under the Alberta offset system are required to have resulted from actions taken on or after January 1 2002.

Crediting period
The crediting period begins on the registration date. Projects have an initial crediting period of eight years with the possibility of extension for an additional five years. The crediting period is 60 years for forestry carbon sequestration projects, and it is 20 years for sequestration resulting from tillage management projects.

Co-benefit objectives and requirements
There are no specific co-benefit requirements for project eligibility. Other environmental benefits may be considered when determining the eligibility of an offset project (Alberta Environment, 2008).

Additionality and quantification procedures
Additionality requirements
Additionality requirements under the Alberta offset system are defined in generic terms. Projects are required to be real, demonstrable and quantifiable, and to not be required by law (Alberta Environment, 2007). No specific additionality tests or protocols are used in the evaluation of an offset project but issues concerning additionality are addressed during the multi-stakeholder technical review process and during the public posting period.[50]

Quantification protocols
A bottom-up approach is used to develop baseline quantification protocols under the Alberta offset system. Offset project developers propose baseline quantification methodologies that are then reviewed and approved by Alberta Environment. Monitoring requirements are not specified in the quantification protocols.

49 As of July 2008, quantification protocols are available for the following projects types: acid gas injection, afforestation, beef feeding, beef-feed days, beef lifecycle, biofuel, biogas, biomass, compost, energy efficiency, enhanced oil recovery, streamlined enhanced oil recovery, landfill bioreactor, landfill gas, modal freight, pork, road rehabilitation, run-of-the-river electricity systems, solar electricity systems, tillage, waste heat recovery, streamlined waste heat recovery and wind-powered electricity systems. The latest approved protocols are available on the program website at http://www.environment.alberta.ca/1238.html.

50 A. Ridge, personal communication, Alberta Environment, June 16 2008.

In order to address the issue of permanence in forestry projects, the Alberta offset system has developed an 'assurance factor approach' based on consultations with the industry, Canadian government agencies and experts. Assurance factors are used to discount the offset credits generated from carbon sequestration projects in any one year to the volume of offset credits that would be considered permanently sequestered. Once discounted, the liability is transferred from the project proponent to the Government of Alberta and the offsets achieved are valued as permanent. The Government of Alberta intends to continue to monitor the effectiveness of assurance factors in managing risk and maintaining environmental integrity.

Project approval process

Validation and registration

Validation and registration are optional under the Alberta offset system. The Alberta government's position is that validation is essentially a business risk management tool, and that it can be contracted to the private sector to perform this task (Alberta Environment, 2007). Based on the performance of the first compliance period, these stages of Project Approval Process are expected to be revised as needed.

Monitoring, verification and certification

Verification and monitoring of the offsets used to achieve compliance are required under the Alberta Offset System.

Offset project developers are required to prepare a monitoring plan, which includes details of the monitoring equipment to be used, the locations of the sampling points, the frequency of the sampling events and the data collection methodology. The plan must be submitted to Alberta Environment.

A yearly verification report must be submitted to Alberta Environment by all regulated entities using offset credits to achieve compliance. All verification reports must have the endorsement of a third-party auditor who is either a professional engineer or a chartered accountant with a background in both auditing and gas emissions. The regulator tracks all verified emission offsets from projects that are used for compliance and may randomly audit verification and compliance reports submitted to avoid double counting in the Alberta system.

Registries and fees

Each offset project developer is required to develop an Offset Project Plan, which includes a description of the project and the baseline used, and a monitoring and quantification plan. This information is included in the GHG Clean Projects Registry, a registry developed by the Canadian Standards Association for Alberta's emission offset project participants only. The purpose of the registry is not to provide assurance of the validity of credits or to serve as an offset credit trading platform, but only to serve as a means of recording project and credit information.

The registry fee for activating a project account and filing a completed application is USD 193 (CAD 200). A fee of USD 241 (CAD 250) is charged for displaying preliminary project information, the GHG Report or the Validation Report. To allocate a serial number to and display VERRs from a project there is a fee of USD 0.05 (CAD$0.05) per VERR. No additional fees are charged to delist or retire VERRs (Canadian Standards Association, n.d.).

Selected issues

Following the completion of the first compliance period in March 2008, Alberta Environment held a meeting to review of the offset system and produced a paper summarizing stakeholder comments identifying the successes and the areas for improvement in the system. The analysis of the Alberta offset system market function identified the following issues:

- a lack of market liquidity due to long transaction times and high transaction costs, although these are expected to decline with increased learning by participants;
- government approved protocols have enhanced administrative efficiency but the process remains cumbersome for participants;
- a lack of pricing transparency, with the news media being the only reporting source;
- a lack of general understanding among offset suppliers of the offset protocol calculation methodologies for generating carbon credits;
- a lack of standardization of terms across the marketplace for contract design;
- market uncertainty over the future regulatory environment in Canada (Rund *et al*., 2008).

The recommendations for Alberta Environment to improve the Alberta offset system included:

- allowing non-Alberta offsets for compliance;
- creating an Alberta-based public exchange for credits that would facilitate more trading and provide more communication on where and how to purchase offsets;
- streamlining the protocol review and approval process;
- developing more protocols for different offset project types (Rund *et al*., 2008).

Several aspects of the design of the Alberta offset system have raised concerns about the quality of the offset credits generated. For one, the Alberta Government does not certify the offsets and places the responsibility for ensuring that the offsets are real on the facilities that are being regulated. This concern would be addressed to some degree if the Alberta Government were to carry out periodic audits of the third-party verification of emission offset reductions. Establishing a system of government certification would be consistent with other offset programs, including the federal offset system being developed in Canada, and has been recommended as a means to increase market and public confidence in the system (Whitmore and Shariff, 2007).

Additionality concerns have been raised about the January 1 2002 start date for determining the eligibility of offset projects. Critics argue that it is 10 months before the release of Alberta's first climate change plan (in October 2002) and that commercial projects which became operational in 2002 and 2003 were highly likely to have already been in the planning and construction phases before the plan was published (Whitmore and Shariff, 2007).

References

Alberta Environment (2008). *Offset Credit Project Guidance Document: Specified Gas Emitters Regulation.* February 2008, http://www.environment.alberta.ca.

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Whitmore, J. and Shariff, N. (2007). *Comments on Alberta's Offset System Project Guidance Document* [draft], June 20 2007. The Pembina Institute and Toxics Watch Society of Alberta. Available at http://pubs.pembina.org/reports/Comments-Alb-offset.pdf.

6.2 State Power Plant Rules of Oregon, Washington and Massachusetts

Oregon: http://www.oregon.gov/ENERGY/SITING/docs/ccnewst.pdf

Washington:
http://www.leg.wa.gov/pub/BillInfo/2003-04/Pdf/Bill%20Reports/House/3141.HBR.pdf

Massachusetts: http://www.mass.gov/dep/air/laws/ghgappb.pdf

Overview

Type of system/program and context

Three US states, Oregon, Washington and Massachusetts, have set mandatory CO_2 emission standards for their state's energy facilities. Although the specific programs vary by state, regulated facilities in all states have the option of meeting their emission reduction obligations either through on-site emission reductions or the purchase of eligible offset credits.

In 1997, Oregon became the first US state to regulate GHG emissions from energy facilities. The regulations were updated in 2003, requiring energy facilities to meet an emission standard that is 17% better than the most efficient base-load gas plant currently operating in the US. This translates to a standard of 0.675 pounds (lbs.) of CO_2 per kWh of net electricity output (Oregon Energy Facility Siting Council, n.d.).[51]

In Washington, regulations governing GHG emission from energy facilities was passed in 2003 and updated in 2004. It establishes a CO_2 mitigation plan requiring energy facilities to offset 20% of CO_2e emissions over a 30-year period.

In Massachusetts, legislation to cap emissions from six energy facilities at historical emission levels was passed in 2006 (MassDEP, n.d.b).

Facilities in all three states may meet their emission standard through on-site emission reductions. In Oregon and Washington, facilities can sponsor their own offset projects or pay a fee to a qualified organization to manage and purchase offsets on their behalf at a cost that is below the market value for offsets.

In Massachusetts, the purchase of certified GHG credits was the only alternative mechanism for compliance in the original regulation. However, on December 24 2007 the Massachusetts Department of Environmental Protection (MassDEP) determined that insufficient GHG credits were available for affected facilities to demonstrate compliance and they allowed payments into the GHG Expendable Trust, at the trust trigger price set by regulation,[52] as an alternate means of compliance (MassDEP, n.d.a).

51 See the website: http://tinyurl.com/4n8cqg for the most recent standard.

52 The rate is expected to be set at USD 10.50 per short ton of CO_2e. J. Colman, personal communication, Massachusetts Department of Environmental Protection , 8 January 2008.

After another regulation change in May 2008, facilities are now allowed to comply using certain offsets generated under the CDM and the EU ETS (MassDEP, 2008).

Program authority and administrative bodies

All three states have a program authority to administer, verify, validate, approve and register offset projects used for compliance with state regulations.

Oregon: the Energy Facility Siting Council.

Washington: for energy facilities 350 MW and larger: the Energy Facility Site Evaluation Council; and for energy facilities 25 MW–350 MW: the Department of Ecology.

Massachusetts: the Department of Environmental Protection.

In addition, the Climate Trust was established as the only qualified organization to manage and purchase offset credits using the funds generated from Oregon's compliance fees. The Climate Trust is an offset project developer as well as an offset retailer (see section 12.1 on the Climate Trust for details).

Regional scope

Each state program regulates GHG emission from energy facilities within its state jurisdiction only.

Recognition of other standards/ linkage with other trading systems

Washington and Oregon are both members of the Western Climate Initiative (WCI, see section 5.5). It is not yet clear how the power plant rules in Washington and Oregon will be incorporated or revised as the WCI process develops. Emission reductions from these programs may be considered for early action credit under the WCI.

In 2007 and 2008, the Washington Legislature passed laws related to GHG emissions. The 2007 law establishes a GHG intensity requirement for new and existing power plants, which is set at 1,100 lbs of CO_2e per MWh.[53] The 2008 law establishes a GHG emission reporting program in support of the anticipated WCI cap and trade program.

In Massachusetts, 2007–2008 will be the first and only compliance period for the state emission cap on energy facilities. Once the Regional Greenhouse Gas Initiative (RGGI) starts in 2009, the Massachusetts program will be phased out. Based on the June 2008 determination of the availability of GHG credits, regulated facilities may apply to verify and use European Union Emission Trading Scheme (EU ETS) Phase II Allowances and Clean Development Mechanism (CDM) CERs that are eligible for use under Phase II of the EU ETS for compliance purposes (MassDEP, 2008).

53 Chapter 80.80, Revised Code of Washington, Greenhouse Gas Emissions.

Market size and scope

Tradable unit and pricing information

All tradable units, for each of the state power plant programs, are measured in short tons of CO_2e.

Oregon term: "CO_2 offset'; All facilities, to date, have chosen to pay a fee of USD 1.27 per short ton CO_2e (USD 1.40 per metric ton CO_2e) using a qualified organization (The Climate Trust) to purchase/manage offsets at below the market price of offsets. No facilities have successfully directly implemented their own offset projects and no pricing information is available for this approach.

Washington term: "Carbon Credit"; Facilities can pay a fee of USD 1.60 per metric ton CO_2e using a qualified organization to purchase/manage offsets at below the market price of offsets. No pricing information is available for facilities that may choose in the future to directly implement their own offset projects.

Massachusetts term: "GHG Credit"; The first compliance period for regulated sources will be 2007–2008, and several GHG Credit applications have indicated that project developers expect GHG Credit prices to be approximately USD 5.00 per short ton. Payments into the GHG Expendable Trust, a recent supplemental compliance mechanism, are expected to be set at a price of USD 10.50 per short ton of CO_2e. [54]

Participants/buyers

Energy facilities serve as both the program participants and the offset buyers in each of the state power plant programs.

Oregon: Regulation applies to all new energy facilities.

Washington: Regulation applies to all new energy facilities greater than 25 MW in size and existing facilities that increase their energy output by 25 MW or CO_2e emissions by 15% or more.

Massachusetts: Regulation applies to six currently existing power generation facilities.

Current project portfolio

Oregon: Oregon is the only state with current transactions for offsets from regulated facilities for compliance with the state program. The monetary offset rate payments have remained below the market price for offsets, all six of the new energy facilities regulated under the state power plant rule in 1997 have achieved compliance with the emission standard through payments to the Climate Trust. The Climate Trust reports that payments through the OR program have offset 1.5MmtCO_2 (The Climate Trust,

54 J. Colman, personal communication, Massachusetts Department of Environmental Protection, January 8 2008.

n.d.) through a range of project types in the Climate Trust's offset portfolio (see section 12.1).

Washington: None of the new qualifying energy facilities has chosen to purchase offsets for compliance since this legislation came into effect and, as a result, no transactions have occurred. The only new facilities subject to the law and regulation are a few small cogeneration or biomass fueled facilities. The cogeneration facilities had to demonstrate that their CO_2 emissions were not subject to the law's provisions and the biomass facilities have undertaken small self-directed mitigation projects.

Massachusetts: Because 2007–2008 is the first compliance year there are not yet any records of current offset market transactions. Massachusetts issued a proposed approval for a landfill gas project in April 2008 and evaluated applications from five other offset projects over the summer of 2008.

Offset project eligibility

The offset project eligibility requirements for the Oregon and Washington programs outlined below pertain to offset projects developed and managed directly by regulated facilities. In Oregon, the Climate Trust is currently the only qualified organization selected to manage offset funds. See the Climate Trust offset program review (section 12.1) for further information regarding their offset project eligibility requirements.

Project types

Oregon: Any project which avoids, sequesters or displaces CO_2 emissions.

Washington: Any project which avoids, sequesters or displaces CO_2 emissions and is approved by the Energy Facility Site Evaluation Council or the Department of Ecology, as applicable.

Massachusetts: Any project which reduces emissions, avoids emissions or sequesters emissions, except for nuclear power generation and underwater or underground sequestration activities.

Project locations

Oregon: Any location.

Washington: Not specified.

Massachusetts: Anywhere in the United States or the coastal waters thereof. Approved EUAs and CERs have no project location restrictions (MassDEP, 2008).

Project size

Oregon and Washington: There are no project size limitations for the Oregon or Washington programs.

Massachusetts: Offset projects must generate an average over the period applied for of at least 5,000 short tons of CO_2e per year. For projects not located in Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Rhode Island and Vermont or the coastal waters thereof, the minimum is 20,000 short tons of CO_2e.

Start date

Oregon: There are no start date requirements for the Oregon program.

Washington: Mitigation projects directly managed by the facility owner must have started after July 1 2004.

Massachusetts: The start date for offset projects is January 1 2006.

Crediting period

There are no crediting period specifications for any of the state programs.

Co-benefit objectives and requirements

Oregon and Washington: No co-benefit requirements

Massachusetts: No explicit rules, but the program administrators may consider "the extent to which a project may be harmful to the environment or public health when certifying or verifying GHG Credits" (Mass DEP, n.d.b.).

Additionality and quantification procedures

Additionality requirements

Additionality requirements in all three programs are very general.

Oregon: Offsets must be regulatory surplus and will be evaluated based on the "extent to which the CO_2 reductions would have occurred in the absence of the offset project" (Oregon Energy Facility Siting Council, n.d.)

Washington: Offsets must "a*ccomplish CO_2 reductions that would not otherwise take place*" (Washington Legislature, 2004).

Massachusetts: Offsets must be regulatory surplus, "real and additional" and applicants may be required to "specify the best management practice used to determine an emissions baseline" (Mass DEP, n.d.b.)

Quantification protocols

Oregon: No specific quantification protocols are provided,. The Oregon regulation simply states that sufficient documentation must be provided to the program administrator in order "*to determine what reductions resulted from the projects, based on the monitoring and evaluation the applicant proposes*" (Oregon Energy Facility Siting Council, n.d.).

Washington: No specific quantification protocols provided

Massachusetts: Offset project developers must specify the best management practice used to determine the emissions baseline and the quantification protocol used for calculating offset credits, as well as a proposed method for determining, monitoring and assuring compliance (Mass DEP, n.d.b.). All offset project applications must contain a description of potential project leakage, and describe how such leakage was or will be monitored and avoided (Mass DEP, n.d.b.). Offset credits will be voided to the extent of any leakage that is identified (Mass DEP, n.d.b.). To address permanence concerns of carbon sequestration projects the land owner must, at a minimum, "place the land within the sequestration project boundary under a legally binding instrument, acceptable to the Department, that the sequestered emissions remain captured and securely stored in perpetuity" (Mass DEP, n.d.b.).

Project approval process

Validation and registration

Oregon: The program administrator reviews the project additionality and baseline quantification materials submitted for an offset project sponsored by a regulated entity. Validation of offset projects is carried out by the program administrator based on the review of submitted materials.

Washington: Offset projects must be approved by either the program administrator, the Washington State Energy Facility Site Evaluation Council or Department of Ecology or a local administrator, and must be included in the regulated entities' site certificates or order of approvals.

Massachusetts: There are no offset project validation or registration requirements. All offset projects are reviewed and approved through either the prospective or the retrospective certification process discussed in the section below.

Monitoring, verification and certification

Oregon: Offset project monitoring, verification and certification are carried out by the program administrator. The program administrator ensures that the proposed project is implemented by including restrictions in the site certificate for regulated facilities, but may not require that "the applicant guarantee that it will achieve the predicted CO_2 offsets from these projects" (Oregon Energy Facility Siting Council, n.d.).

Washington: There are no explicit verification or certification requirements, but the legislation states that "implementation will be monitored by an independent entity" (Washington Legislature, 2004).

Massachusetts: Certification and verification of offset projects are based on approval by the MA Department of Environmental Protection. Certification can take place either prior to project implementation (prospective certification) or after implementation (retrospective certification). Verification of offset credits must occur within two years of project activity. Applications for project certification and verification must contain a complete project description, a quantification protocol, an estimate of the offset credits generated, a monitoring methodology and the expected offset sale price.

Registries and fees

Oregon: No registry exists for tracking offset projects, but the program administrator holds "in trust the CO_2 offsets that the certificate holder provides in order to meet the CO_2 standard" (Oregon Energy Facility Siting Council, n.d.).

Washington: No registry requirements exist for tracking offset projects or credits generated.

Massachusetts: The GHG Registry serves as the Massachusetts state registry to track offset credits used for compliance under the state program.

Selected issues

The ongoing development of regional climate policy initiatives in the US means that future changes to state level policies on emission standards are expected.

Massachusetts: Massachusetts, as a partner to RGGI, will phase out its state CO_2 emission standard at the end of 2008. Compliance with RGGI will expand the number of regulated facilities in Massachusetts from six under the current state regulation to 32.[55] The GHG offset credits generated under the current emission standard may be applied toward the 2007–2008 state compliance period. However, if they were not from one of the five offset categories allowed under RGGI, and if applications were received by January 25 2008, credits could have been exchanged for RGGI allowances at a ratio of two short tons of CO_2e for every one RGGI allowance.

Development of state level emission standards has provided valuable experience and lessons learned for state involvement in RGGI and Western Climate Imitative (WCI) processes. In Massachusetts, the Department of Environmental Protection has served as the program authority for the state emission standard, developing and revising regulation and participating in the development of the RGGI Model Rules. Although few offset projects have been developed and reviewed under the state standards, the development of the state emission standards is believed to have increased staff

55 J. Colman, personal communication, Massachusetts Department of Environmental Protection, January 8 2008.

understanding and capacity related to GHG offset credits and overall has increased readiness for the state's participation in RGGI.[56]

Washington and Oregon are both members of the WCI. The WCI design process is to be developed by 2008, and is likely to affect state emission standards in Washington and Oregon. Emission reductions made by regulated facilities in Oregon are likely to be considered as early action credits as part of the WCI process.

Oregon: In Oregon, where emission standards have been in place for the longest, since 1997, experience has provided several lessons learned for the states participating in the WCI process. Regulation in Oregon resulted in the establishment of the Climate Trust, which has demonstrated an effective business model for offset providers and has provided valuable lessons for the developing carbon offset market.[57]

Although regulated entities have the option to acquire their own offset credits to achieve compliance, the Oregon Department of Energy has found that the failed attempt of the Klamath Cogeneration Plant to do so has strongly increased support from utilities for a fixed price compliance option.[58] The Klamath Cogeneration Plant, constructed prior to the establishment of the Oregon state emission standard, won the bid to build a new energy facility by agreeing to acquire GHG offsets. When the international offset projects developed by the plant's third-party contractor failed to be verifiable, the plant was required instead to pay the monetary offset fee to the Climate Trust. Since then, other investor-owned utilities in the state have expressed increased concern about independently developing offset credits for compliance.

Although the state emission standards appear to have provided valuable lessons for regional initiatives, concerns have been raised regarding the effectiveness of the emission reductions in the Washington and Oregon state regulations. Monetary offset fees have been set at levels well below the market price: facilities in Oregon pay a fixed price to the Climate Trust, currently set at USD 1.67 per short ton of CO_2e, a price significantly lower than the retail offset price of USD 12 per short ton that the Climate Trust offers. There is obvious concern that the contributions made by regulated facilities have not effectively offset actual emissions. It is suggested by staff members that the starting price for the monetary offset fees was expected not to cover the full cost of equivalent offset credits, but to serve as a starting point from which to raise fees over time, providing incentives for emission reductions.[59]

56 J. Colman, personal communication, Massachusetts Department of Environmental Protection, January 8 2008.

57 P. Carver, personal communication, Oregon Department of Energy, January 7 2008.

58 J. Colman, personal communication, Massachusetts Department of Environmental Protection, January 8 2008.

59 P. Carver, personal communication, Oregon Department of Energy, January 7 2008.

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7 CARBON OFFSET FUNDS

Carbon funds, both public and private, vary widely in their focus and the nature of their investments. Some funds focus exclusively on purchasing carbon offset credits, while others invest in projects or companies that have the potential to generate carbon assets. A study in late 2007 estimated that there were 58 carbon funds in operation and projected that the number would reach 67 in 2008. The 58 funds were expected to have USD 10.8 billion (EUR 7 billion) in management in 2007 and to increase to nearly USD 14.6 billion (EUR 9.5 billion) in 2008 (Cochran and Leguet, 2007). This section focuses on the funds managed by the World Bank's Carbon Finance Unit, which manages the largest pool of investments worth over USD 2 billion (World Bank, 2007), and focuses predominantly on Clean Development Mechanism (CDM) and Joint Implementation (JI) offset credits.

7.1 World Bank Carbon Finance Funds

www.carbonfinance.org

Overview

Type of system/program and context

The World Bank's Carbon Finance Unit (CFU) manages carbon funds using resources contributed by companies and the governments in industrialized countries to purchase project-based GHG emission reductions from projects in developing countries and countries with economies in transition (EIT).

The World Bank's carbon finance initiatives are part of the Bank's mission to reduce poverty through its environment and energy strategies. Through its work, the Bank endeavors to ensure that developing countries can benefit from international efforts to address climate change. The role of the CFU is to catalyze a global carbon market by reducing transaction costs, supporting sustainable development, strengthening developing country capacity and ensuring that the benefits of the carbon market reach the poorer communities of the developing world.

The World Bank started its carbon finance operations in 2000, launching the world's first global carbon fund, the Prototype Carbon Fund, with a mission to pioneer the project-based GHG emission reduction market within the framework of the Kyoto Protocol and to contribute to sustainable development. Since then, it has created nine additional new funds and facilities,[60] taking the total assets in its 10 funds to over USD 2 billion (World Bank, 2007). In September 2007, the World Bank's Board of Executive Directors approved the creation of two new carbon facilities – the Carbon Partnership Facility and the Forest Carbon Partnership Facility. The former will pilot ways to use carbon finance on a larger scale and over longer timeframes, while the latter will do so

60 BioCarbon Fund, Community Development Carbon Fund, Italian Carbon Fund, The Netherlands CDM Facility, The Netherlands European Carbon Facility, Danish Carbon Fund, Spanish Carbon Fund, Umbrella Carbon Facility and Carbon Fund for Europe.

in new areas such as avoided deforestation. The ultimate goal of these facilities is to help developing countries move towards low carbon development paths.

Program authority and administrative bodies

The emission reductions are purchased through one of the CFU's carbon funds on behalf of the fund's contributor or contributors. The CFU is responsible for the overall management of the carbon funds. CFU staff review project proposals, prepare project documentation for consideration by each fund's Participants Committee and contracts with the project developers for the purchase of emission reduction credits.

The Participants Committee for each fund is responsible for reviewing projects and authorizing the purchase of credits using the fund's resources. The committee is comprised of the contributors to the fund, or of a sub-group of the contributors if there is a large number of participants in the fund.

The World Bank has also constituted a Host Country Committee to advise it on its carbon finance capacity building and training activities. This committee is comprised of representatives from countries that have signed a memorandum of understanding with the Bank to participate in the committee or that benefit from a CDM or a JI project supported by a Bank-managed carbon fund. At present, there are over 50 countries represented on this committee.[61]

Regional scope

The World Bank Carbon Finance Funds work internationally. Through the CDM and JI, the funds develop projects in both Kyoto Annex-1 and non-Annex I countries. Select carbon funds have a specific geographic focus. For example, the Netherlands European Carbon Facility focuses on the purchase of credits from JI projects located in countries with economies in transition that serve to meet the Netherlands' compliance obligation. Similarly, the Netherlands CDM Facility focuses on the purchase of credits from CDM projects located in developing countries.

Recognition of Other Standards/ Linkage with Other Trading Systems

Projects developed through the World Bank Carbon Finance Funds are required to adhere to the Kyoto Protocol mechanism's standards. The purchase of CERs and ERUs by World Bank funds is designed to enable the contributors to the funds to meet their emission reduction targets either under the Kyoto Protocol or the EU ETS.

Market size and scope

Tradable unit and pricing information

The World Bank Carbon Finance Funds purchase CDM Certified Emission Reductions (CERs), Joint Implementation (JI) Emission Reduction Units (ERUs) and temporary CERs (tCERs) for afforestation and reforestation projects, as well as Assigned Amount Units (AAUs). In some cases, they also purchase Verified Emission Reductions (VERs) with the aim of converting them into Kyoto-compliant units. The World Bank

61 See link for the list of countries: http://tinyurl.com/4enouq.

Carbon Funds' VER purchase agreements aim to shift the Kyoto regulatory risks from the seller to the buyer. Thus, the seller receives payment for independently verified emission reductions. Any discrepancy in the quantity of ERs between the VERs schedule specified in the purchase agreement and the issuance of CERs, for example, due to differences in methodology or delays in the registration of the project by the CDM Executive Board, is analyzed carefully by the CFU. The assessment may result in an amendment to the purchase agreement to make it compatible with the expected CER volume, the transfer of VERs to fund participants or the cancellation of VERs.[62]

The World Bank's purchase prices for the different emission reduction units it buys are not publicly available. However, the Bank has published its approach to determining price ranges for Emissions Reduction Purchase Agreements (ERPAs).[63] It starts with a benchmark price, which is comparable to that which other market players have paid for similar transactions, and then adjusts the premiums or discounts based on the risks involved and how that risk is shared between the seller and the World Bank. Prices vary over time based on market supply and demand, as well as other factors such as project, regulatory and other risks, technology type, project location, project co-benefits, payment timing and other costs. The preference of fund participants for projects of a specific technology type, and other environmental and social benefits also have an impact on the price.

Participants/buyers

The buyers, the fund participants (via the World Bank), include 16 governments and 66 private companies. The sellers of the emission reductions may include project developers in any Kyoto Annex-1 or non-Annex I country.

Current project portfolio

As of August 2007, the World Bank reported that 202 projects were in the pipeline (World Bank, 2007). It expects these projects to yield an estimated contract value of more than USD 2.5 billion for more than 300MtCO_2e of emission reductions. Emissions Reduction Purchase Agreements (ERPAs) have been signed with 89 of the projects, to buy more than 200MtCO_2e worth of emission reductions at a cost of approximately USD 1.5 billion. These purchases date back to 2000 when the World Bank's Prototype Carbon Fund was the only fund purchasing emission reduction credits and the prices of the credits were low. From the first delivery of emission reductions to the carbon funds to August 31 2007, 6.9MtCO_2e of certified and verified emission reductions have been delivered, and the suppliers of these credits received net payments amounting to USD 39.8M (World Bank, 2007).

62 World Bank Carbon Finance Unit, personal communication, spring 2008.

63 The document "The World Bank's Approach to Determining Price Ranges for ERPAs" was provided to the authors of this report by the World Bank Carbon Finance Unit.

Offset project eligibility

Project types

The World Bank Carbon Finance Funds have no project type restrictions. However, specific funds have been designed to provide funding for specific project or technology types. For example, the BioCarbon Fund (BioCF) focuses on land-use and forestry projects, while the Community Development Carbon Fund focuses on projects with community development attributes. The Netherlands CDM Facility prioritizes projects in the following categories: i) renewable energy; ii) clean, sustainably grown biomass (not from biomass waste); iii) energy efficiency improvements; iv) fossil fuel switch and methane recovery; and v) sequestration. Similarly, the Danish Carbon Fund prioritizes projects in the areas of wind power, cogeneration , hydropower, biomass and landfills.

Project location

The World Bank Carbon Finance Funds have no overall project location restrictions beyond those existing for CDM and JI projects.

Project size

There is no upper limit on project sizes. However, the World Bank will typically not consider small-scale projects that generate less than 50,000 tCO_2e of emissions reductions per year – a threshold it considers necessary for the project to be viable under CDM and JI, although there are exceptions.

Start date

CDM and JI project start date requirements apply.

Crediting period

CDM and JI crediting period requirements apply. The crediting period may vary to some extent for VERs generated by projects where, for example, registration by the CDM Executive Board is delayed.

Co-benefit objectives and requirements

In addition to the CDM and JI rules, the World Bank requires that all projects comply with the World Bank Group's Environmental and Social Safeguard Policies.[64]

Additionality and quantification procedures

Additionality requirements

CDM and JI requirements apply.

Quantification protocols

CDM and JI requirements apply. The World Bank Carbon Finance Unit has developed several methodologies for projects in its portfolio (see 7.1.6 Selected Issues).

64 See http://tinyurl.com/sxmkl.

Project approval process

Validation and registration

CDM and JI requirements apply. The World Bank works with CDM- and JI-approved independent auditors to validate and verify projects within their portfolio.

Monitoring, verification and certification

CDM and JI requirements apply.

Registries and fees

Carbon assets are forwarded to the Fund Participants' accounts (in their respective national registries) on a pro rata basis, according to each participant's share in the Carbon Fund. In the case of CERs, the credits are transferred from the CDM registry, while ERUs are directly transferred from the national registry of the project host on issuance. The World Bank is in the process of developing a carbon asset registry system to track the World Bank Carbon Funds' carbon assets.

The CFU does not publish information regarding the fees it charges. However, the World Bank, as trustee of the Carbon Funds, manages the funds on a not-for-profit basis.

Selected issues

In the early years of the carbon market, the World Bank played a pioneering role by setting up the first carbon fund – the Prototype Carbon Fund. It also helped to develop many of the approved CDM methodologies in existence today. By 2006, the World Bank had developed 27% of all approved methodologies (World Bank, 2006b). More recently, it has contributed to the development of methodologies for programmatic CDM, and methodologies in the forestry and transportation sectors (World Bank, 2007c), where CDM project development have been scarce, in part for methodological issues.

Through the recent introduction of two new carbon facilities, the CFU is trying to address some of the current challenges in the carbon market. The Carbon Partnership Facility aims to address the lack of investment in large-scale energy infrastructure with long-term emission reduction potential, which results from regulatory uncertainty beyond 2012 (World Bank 2008b). The Forest Carbon Partnership Facility is trying to address the problem of deforestation and degradation by valuing the carbon in standing forests, thereby providing an incentive for its sustainable use (World Bank 2008b).

Despite its pioneering role in the creation of new carbon funds, the World Bank is not without its critics. One of the key issues raised is that the price premiums offered by some of the buyers in the carbon market, including by the World Bank-managed carbon funds, have not been sufficient to significantly improve the internal rate of return for renewable energy projects (Pearson, 2007). This criticism is debatable since the CFU is arguably not the price-setter for the CDM market. At the same time, however, the

Technology Distribution in percentages (by number of projects)

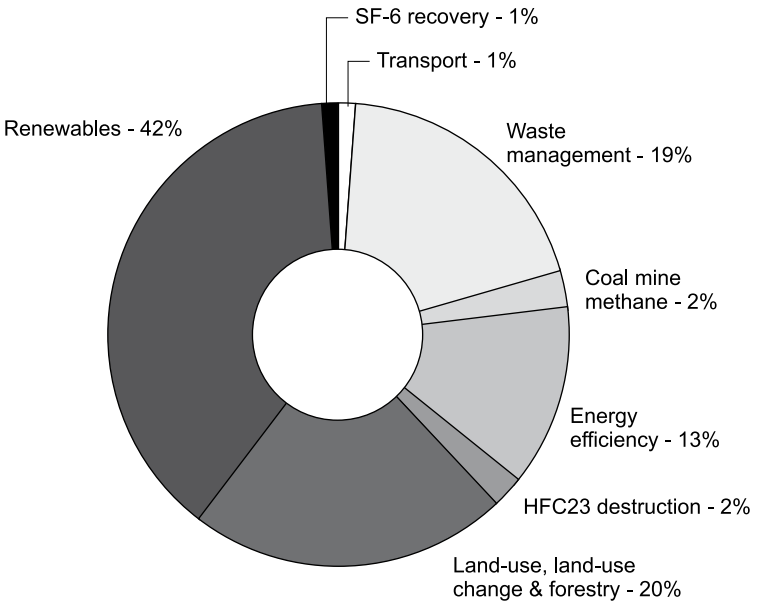

Figure 7.1: World Bank Carbon Finance Funds Project Portfolio by Technology Type, as of May 2008
Source: World Bank Carbon Finance Unit

World Bank as a whole is uniquely positioned to drive financing towards renewable energy.

Further criticisms relate to the World Bank's lending activities, and not necessarily to its carbon finance activities in particular. Nonetheless, it is important to highlight them as the Bank embarks on efforts to mainstream valuing carbon into its lending activities. For example, it has been criticized for continuing to invest, and perhaps even increasing its investments, in emissions-intensive projects such as coal-fired power or oil and gas development (Park, 2007; FOE, 2005).

In an effort to increase its funding available to address climate change in developing countries, The World Bank announced two new Climate Investment Funds in July 2008. One of the funds, the Clean Technology Fund, will serve as the Bank's financing vehicle to accelerate low-carbon investments in developing countries. To complement this initiative, the CFU is reviewing specific ways in which the World Bank can integrate carbon finance into its other financial mechanisms to provide more effective support to low-carbon projects (2008a).

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8 VOLUNTARY CAP AND TRADE SYSTEMS (OFFSET FEATURES)

Cap and trade systems are typically implemented as government-regulated, mandatory compliance systems (e.g. the Kyoto Protocol, the EU-Emission Trading Scheme and the Regional Greenhouse Gas Initiative (RGGI). A notable exception to this is the Chicago Climate Exchange (CCX), which is a voluntary cap and trade system. A voluntary cap and trade system can play a pioneering role in developing market rules and structures, and providing 'early movers' with the opportunity to gain experience with emission commitments and trading.

8.1 Chicago Climate Exchange

http://www.chicagoclimateexchange.com/

Overview

Type of system/program and context

The Chicago Climate Exchange was launched in 2002 as a voluntary greenhouse gas (GHG) emission cap and trade scheme located in North America. This chapter gives a short overview of the CCX cap and trade program but primarily focuses on its offset program.

Participation in the CCX cap and trade scheme is voluntary, but once entities elect to participate and commit to emission reduction targets, compliance is legally binding. Members can comply by either cutting their emissions internally, trading emission allowances with other CCX members, or purchasing offsets generated under the CCX offset program. There are no limits on the use of offsets for compliance with the emission reduction targets.

In the first phase of the scheme, from 2003 to 2006, CCX members agreed to cut their emissions by 1% each year below their annual average emissions for the period 1998 to 2001, thereby by achieving a reduction of 4% by the end of the fourth year. For the second phase from 2007 to 2010, the original members agreed to cut their emissions by an additional 0.5 % each year to achieve an overall target of 6% below 1998–2001 levels by 2010. New members participating in the second phase must achieve a similar overall reduction target by 2010 by reducing their emissions by 1.5% each year.

Program authority and administrative bodies

The CCX has a well-developed administrative structure, which includes:

- senior Management and staff responsible for the day-to-day administration of the CCX and its operations;

- a 12-member Committee on Offsets comprised of CCX members responsible for reviewing and approving proposed offset projects. Each member is appointed by the CCX Executive Committee for one year with the possibility of renewal;

- a committee on forestry comprised of CCX members responsible for the review of proposed forestry projects;

- a regulatory services provider**,** the National Association of Securities Dealers Inc. (NASD), responsible for auditing the baseline and annual emissions reports of CCX members, monitoring trading activity and reviewing verifiers' reports for offset projects.

- independent auditors called CCX Verifiers responsible for verifying a project's annual GHG sequestration or destruction; (There are currently 29 approved auditors.)

- technical advisory committees comprised of external experts, established at the request of the Committee on Offsets or on an ad-hoc basis by CCX administrators to assist in the development of rules for each offset type.

Regional scope

Initially, CCX membership was limited to the US but it is now open to participants from other countries. Similarly, offset projects were mostly implemented in the US but offsets generated by projects outside the US are now also sold on the CCX.

Recognition of other standards/ linkage with other trading systems

The CCX allows trading of CDM CERs once the project has been approved by the CCX Committee on Offsets. The CERs must be retired in exchange for receiving the CCX's tradable unit, the Carbon Financial Instrument (CFI).

Market size and scope

Tradable unit and pricing information

Carbon Financial Instruments (CFIs) are the tradable units of offset credits under the CCX. One CFI is equivalent to 100 metric tons of CO_2e. CFIs have been traded at an average price of USD 2–USD 7.5 per metric ton of CO_2e.

Participants/buyers

The CCX distinguishes between *members, associate members* and *participant members*. Members are organizations, companies, institutions and municipalities that produce significant direct GHG emissions and are committed to reducing their emissions. In 2008, the CCX had nearly 400 members including companies such as the Ford Motor Company, American Electric Power, Sony Electronics and the Bank of America; US state governments such as the State of New Mexico; and educational institutions such as Michigan State University.

Associate members are entities that produce negligible direct GHG emission but are committed to offsetting 100% of their indirect emissions associated with energy purchases and business travel.

Participant members include Offset Providers, owners of title rights to credits generated by offset projects and Offset Aggregators, which are entities that serve as the administrative representative of multiple offset projects, in particular projects generating less than 10,000 $mtCO_2e$ in emission reductions per year.

Current project portfolio

As of July 2008, the CCX had registered approximately 40$MmtCO_2e$ in offsets from over 100 projects.[65] More than half the US offset volume traded in 2007 was traded though the CCX (Point Carbon, 2007c).

Offset project eligibility

Project types

Project types eligible to register and sell offsets on the CCX include:

- energy efficiency projects;
- fuel switching projects;
- renewable energy projects;
- methane capture coal mines, livestock operations and landfills;
- bio-sequestration through forestry and agricultural management practices; and
- destruction of ozone depleting substances.

Project locations

Projects cannot be located in EU-ETS member states or in other Annex B countries that have ratified the Kyoto Protocol.

Project size

There is no limit on project size.

Start date

Projects that sell offsets on the CCX should not have started before January 1 1999. However, the earliest start date for forestry projects is January 1 1990 and for HFC destruction projects is January 1 2007.

65 As of July 22 2008; the latest information is available at http://www.chicagoclimateexchange.com/offsets/projectReport.jsf.

Crediting period

Most of the eligible project types can earn offsets for the eight-year period 2003–2010. The exceptions include renewable energy projects, which can earn offsets from 2005 to 2010 (six years), HFC destruction projects, which can earn offsets from 2007 to 2010 (four years) and rangeland soil carbon projects, which can earn offsets from 2006 to 2010 (five years).

Co-benefit objectives and requirements

Offset projects must comply with the rules and regulations of the host country. Beyond this legal prerequisite, the CCX does not have requirements to ensure stakeholder involvement and other secondary benefits.

Additionality and quantification procedures

Additionality requirements

Each project undergoes review by the CCX Offsets Committee, where additionality is evaluated. The CCX requires that offset projects are new, beyond regulation and involve "highly unusual practices". Some project types are required to fulfill specific rules:

- commit to five years of continuous no till, strip till or ridge till on enrolled acres for agricultural soil carbon sequestration projects;
- be located within designated land resource regions or other specified locations for rangeland soil carbon sequestration projects;
- be located on deforested or degraded land for forestation and forest enrichment projects, or in specified locations for forest conservation projects if they are undertaken in conjunction with forestation on a contiguous site;
- only destroy ozone depleting chemicals that can no longer be produced (e.g. CFC's which can no longer be manufactured in the US but are still present in refrigerators and air conditioning units); ensure that electricity generated from renewable energy projects is not also sold as "green"; and that if Renewable Energy Credits (RECs) are applicable to the project, they must be surrendered and retired by the CCX to avoid double counting

Quantification protocols

The baselines and methodologies for calculating emission reductions are pre-defined for each eligible project activity. Some baselines are project-specific, including large reforestation projects which are credited relative to measured, site-specific carbon levels prior to the start of the project. Other baselines are quantified using performance standards, such as avoided deforestation projects in Brazil which use pre-determined annual deforestation rates for specific states in Brazil.

CCX rules address the permanence issues around forestry projects by requiring a commitment to the long-term maintenance of project carbon stocks, and a carbon

reserve pool equal to 20% of all offset credits issued for the project and the cancellation of reserve pool offsets in case of sequestration reversal.

Project approval process

Validation and registration

The CCX does not distinguish between validation and verification. Both steps are usually done at the same time and are called "project verification and enrollment". The initial validation of projects is optional.

Monitoring, verification and certification

Verification of emission reduction is done annually. A CCX-approved third-party auditor verifies an eligible project's actual annual GHG emission reduction, sequestration or destruction and submits a Verification Statement to the CCX. Following a successful review by CCX staff and by NASD, the CCX issues the offset provider or aggregator with Carbon Financial Instrument (CFI) contracts equivalent to the quantity of emissions reduced, sequestered or destroyed.

Registries and fees

The CCX Registry is the electronic database that serves as the official record holder and transfer mechanism for CFI contracts. All CCX members have CCX Registry Accounts.

Fees for CCX membership are USD 1,000–60,000 per year, depending on the size and type of member. Offset registration fees are USD 0.12 per metric ton from non-Annex I countries and USD 0.15 per metric ton from Annex-I countries. The trading fee is USD 0.05 per metric ton. Trading and offset registration fees are posted on the CCX website and are subject to change.

Selected issues

The 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 from and gain experience with emission reduction commitments and carbon trading.

The CCX offset program has been criticized for a lack of clearly defined additionality criteria and a general lack of transparency (Bryk, 2006). Its certification and verification process is proprietary, making it difficult to evaluate the quality of its carbon offsets. However, the CCX has made its rulebook chapter on offsets, as well as project-specific offset protocols and related documents, publicly available.[66]

The CCX has also been criticized for the lack of additionality of some of its offsets, in particular those issued to no-till or reduced-tillage projects. For example, farmers can receive CCX offset credits for practicing no-till agriculture even if they have been practicing it for many years. If such credits enter a cap and trade system, emission

66 These documents are available at http://www.theccx.com/content.jsf?id=23.

actually increases because the buyer of the credits will continue to emit and no real emission reductions are achieved through the offsets. The CCX recognizes this, but argues that early action by proactive farmers should be rewarded and not penalized. The argument is that it would unfair to the proactive farmer if only farmers who had just started practicing no-tillage were allowed to earn the credits.

While both arguments are valid, they need not conflict with each other. Early actions can be rewarded through other means, such as special allowances or incentive programs that do not compromise the environmental integrity of carbon caps.

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9 VOLUNTARY GHG REDUCTION PROGRAMS

Voluntary greenhouse gas (GHG) reduction programs enlist entities to voluntarily reduce emissions through internal actions or through the purchase of offsets or allowances. While neither strictly an offset program nor a cap and trade system, they do provide a framework for the development of offset markets and methodologies. This section describes the offset features of two voluntary GHG reduction programs: the US Environmental Protection Agency's (EPA) Climate Leaders Program and the California Climate Registry (CCAR).

9.1 Climate Leaders

http://www.epa.gov/stateply/

Overview

Type of system/program and context

Climate Leaders is the US EPA's voluntary GHG emission reduction program. Launched as an industry-government partnership in 2002, it provides guidance to companies that develop climate change strategies and recognizes their efforts (US EPA, 2008). The program's goal is to focus corporate attention on cost-effective GHG reduction and energy efficiency projects within the boundary of the organization through support and assistance from the US EPA (US EPA, 2008).

Partner companies complete a corporate-wide inventory of the six major GHGs using the Climate Leaders GHG Inventory Guidance and set a corporate-wide GHG emission reduction goal to be achieved over 5–10 years. They also maintain an Inventory Management Plan, which institutionalizes the process of collecting, calculating and maintaining high-quality, corporate-wide GHG data through an annual reporting process with the US EPA (US EPA, 2008). Thus, companies create a documented record of their emission reductions and receive EPA recognition as corporate environmental leaders (US EPA, 2008).

Each partner works individually with the US EPA to set its respective reduction goals based on the emission sources and reduction opportunities within the company (US EPA, 2008). It may choose to develop its own GHG mitigation offset projects or to purchase GHG reductions certified through existing regulated or voluntary markets to achieve its GHG emission reduction goals. Performance-based GHG accounting protocols for offset projects were released in mid-August 2008 to provide guidance to companies using offsets to meet their goals (US EPA 2008). Partners may also use green power purchasing and Renewable Energy Credits (RECs) to reduce their indirect electricity emissions and meet their goals under the program.

Program authority and administrative bodies

The US EPA administers the Climate Leaders Program. US EPA staff provide each program partner with technical assistance as they develop, update and document their Inventory Management Plan (IMP) and complete or adjust their base year inventory.

Regional scope

The Climate Leaders program is limited to industries with operations in the US. Program partners must report US-based emissions and may optionally include their international emissions as well.[67]

Recognition of other standards/ linkage with other trading systems

Climate Leaders partners may meet their emission reduction goals through the purchase of offset credits from regulated or voluntary markets (US EPA, 2008). The criteria for purchasing offset credits are outlined in the Screening Criteria, which include provisions to ensure that the offsets are real, additional, permanent and verifiable (US EPA, 2008). Purchased offset credits are required to be quantified using offset protocols or accounting guidance approved by the US EPA Climate Leaders program. The US EPA reviews the purchased offset credits before deciding on their eligibility for meeting a partner's GHG emission reduction goal.

Market size and scope

Tradable unit and pricing information

Under the Climate Leaders program, offset credits are referred to as "external GHG reductions" and are measured in units of short tons of CO_2e (US EPA, 2007). No pricing information is available. Program partners may purchase offset credits from regulated or voluntary markets, where prices vary by program, or develop offset projects themselves.

Participants/buyers

There were 200 program partners in the Climate Leaders Program as of July 2008 (US EPA, 2008). They represent a broad range of industry sectors including cement, forest products, pharmaceuticals, utilities, information technology and retail, with operations in all 50 US states (US EPA, 2008).

Current project portfolio

No information is yet available. The EPA program administrators are aware that projects are being developed under the Climate Leaders methodology, and that offsets have been purchased from various sources; however, neither a Climate Leaders registry nor a compiled report has been developed.[68]

67 M. Oliva, personal communication, EPA, spring 2008.

68 M. LeFranc, personal communication, EPA, spring 2008.

Offset project eligibility

Project types

The EPA has developed top-down performance standard-based offset protocols for specific project types, including landfill gas, manure management, afforestation, transportation and boiler replacement projects (US EPA, 2008).

Additional offset protocols are being prepared for coal mine methane, forest management and other end-use activities. (US EPA, 2007).

The program's partners are not limited to project types with approved offset protocols. They can purchase or generate GHG reductions from other offset projects but must provide the US EPA with the "performance standard" methodology and data used to calculate the purchased GHG reductions (US EPA, 2008).

Project locations

Offset projects can be located in the US and internationally.

Project size

All project sizes are eligible but commercial boiler replacement projects have specific size restrictions.[69]

Start date

Under development.

Crediting period

Under development.

Co-benefit objectives and requirements

Environmental benefits and impacts will be addressed in the Climate Leaders offset guidance document to be released in the near future. There is no requirement to quantify co-benefits, and the guidance document does not provide specific guidelines.[70]

Additionality and quantification procedures

Additionality requirements

Offset program protocols use a "performance standard" methodology to assess additionality. Depending on the project type, emissions performance may be defined as an emission rate, a technology standard or a practice standard (US EPA, 2007). Offset projects are required to achieve performance emission reductions that are significantly better than business-as-usual practices determined from similar, recently undertaken or planned practices in a similar geographic region (US EPA, 2007).

69 Commercial boiler replacement projects must have an input capacity of between 300,000 and 8 million Btu per hour.

70 M. LeFranc, personal communication, EPA, spring 2008.

Quantification protocols

The project protocols developed by the US EPA are based on a top-down performance standard approach. Quantification protocols for eligible project types are consistent with the *Greenhouse Gas Protocol: The GHG Protocol for Project Accounting* (see section 10.1).

Project-specific guidelines regarding leakage and permanence are addressed in the protocols for each project type. If it is determined that leakage may result in significant emissions, these emissions must be quantified and included in the calculation of reductions; however, a specific quantification methodology is not required. The EPA states that "all associated activities determined to contribute to leakage should be monitored."

Project approval process

Validation and registration

The US EPA reviews all proposed external GHG emission reductions from offset projects, generated or purchased, for eligibility in meeting the Climate Leaders reduction goal. The review is based on the project information provided by the program partner.

Monitoring, verification and certification

Protocols for monitoring offset projects have to be submitted to and reviewed by the US EPA during its review process for external GHG emission reductions (US EPA, 2007). Although third-party verification is widely recommended for purchased offset credits, third-party verification of offset credits used by partners to meet their GHG reduction goals is not required.

There is no process for certifying offsets under the Climate Leaders program.

Registries and fees

Although not a requirement, Climate Leaders partners are encouraged to retire their offset credits permanently on an appropriate registry (US EPA, 2007).There are no fees associated with the Climate Leaders program.

Selected issues

Since the Climate Leaders program was first established in 2002, the number of participating partner businesses has steadily increased. Both the EPA and the business community have noted the advantages of participation in the Climate Leaders program and see it as a valuable opportunity for businesses to "get up to speed" on the GHG inventory process (Gillies, 2003).

Concerns regarding the progress Climate Leaders partners have made toward achieving GHG emission reductions were raised in a 2006 US Government Accountability Office (GAO) report. At the time of the report, the US EPA had no database for tracking partners' progress and no written policy on what to do about partners that were not

progressing as expected (US GAO, 2006). Despite increasing participation in the program, only half of program partners in November 2005 (51%, 38 out of 74) and in March 2008 (49%, 80 out of 162) had established emission reduction goals. The GAO report noted that it has been a challenge for the EPA, as a voluntary program, to sanction Climate Leaders partners that do not meet all of the program's expectations in a timely manner (US GAO, 2006). The EPA has stated that partners that do not proceed in a timely manner will be informed by telephone and in writing, and then be removed from the program; however, as of 2005 no partners had been removed for their lack of progress (US GAO, 2006).

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9.2 California Climate Action Registry

http://www.climateregistry.org/

Overview

Type of standard and context

The California Climate Action Registry (CCAR) is a non-profit voluntary GHG registry established by the California State Legislature in September 2000 to encourage and promote early actions to reduce GHG emissions. To support this goal, CCAR developed a general reporting protocol and a number of sector-specific reporting and verification protocols to enable its members to calculate emissions and report them, and auditors to verify the reports. CCAR also produced a series of standardized, performance-based, project-specific protocols and accompanying verification protocols to quantify the emission reductions from GHG mitigation projects. This section focuses on the project-specific protocols in the forestry, livestock management and landfill sectors.

CCAR commenced public operations in 2002 with general and sector-specific protocols for entity-wide reporting of emissions. The first set of project protocols for quantifying and verifying forestry projects was launched in 2005 and these protocols were subsequently adopted by the California Air Resources Board in 2007, which recognized the resulting emission reductions as early voluntary actions under the California Global Warming Solutions Act of 2006 (AB-32). This act establishes a program of regulatory

and market mechanisms to achieve real, quantifiable and cost-effective reductions in GHGs. Additional project protocols for reporting and verifying livestock and landfill projects were launched in 2007. CCAR is also developing additional standardized and performance-based protocols for direct emission reduction projects and is expected to complete as many as 10 new protocols by the end of 2009.[71]

In 2007, CCAR worked with other regional non-governmental organizations to build and launch the Climate Registry, a new GHG registry for the North American region covering states in the US, Canada and Mexico. It is expected that the role that CCAR played with regard to entity-level emission inventory reporting will now be taken over by the Climate Registry, whereas CCAR will continue to maintain and expand project-level emission inventory reporting.

Since 2007, CCAR has been developing a new project registry called the Climate Action Reserve, which was launched in March 2008. The project registry will be used to verify, register and track GHG emission reductions from voluntary project activities. It is anticipated that CCAR will be rebranded as the Climate Action Reserve in the near future to reflect both its new focus on project reporting and tracking and its expansion beyond California.

Standard Authority and Administrative Bodies

CCAR is administered by employed staff with overall direction from a Board of Directors. The Board of Directors was established in early 2008 and is comprised of representatives from state government, business, environmental organizations and others.

CCAR's operations are funded by member fees, grants, sponsorships and donations from various foundations and private companies.

Regional scope

CCAR provides services to companies and project developers in the US.

Recognition of other standards/ linkage with other trading systems

CCAR's GHG emission reduction program, including its project-specific protocols and its verifier accreditation and oversight program, has been approved under the *Voluntary Carbon Standard* (VCS 2007, see section 11.3). Forest projects are formally recognized by the State of California as voluntary early actions under AB-32 and similar recognition for CCAR's livestock projects is expected in 2008.[72]

Market size and scope

Tradable unit and pricing information

Projects that achieve verified emission reductions are issued with a serialized Carbon Reduction Ton (CRT) per metric ton of CO_2e emissions reduced or permanently

71 G. Gero, personal communication, California Climate Action Registry, spring 2008.

72 G. Gero, personal communication, California Climate Action Registry, spring 2008.

sequestered. Some of the CRTs issued to approved forestry projects are being traded. In early 2008, Pacific Gas and Electric Company announced it would purchase 200,000 short tons of GHG emission reductions from the Conservation Fund's Garcia River Forest project (PG&E, 2008). The price of USD 9.71 per short ton of CO_2 for the purchase was approved by the California Public Utilities Commission (Woodall, 2008).

Participants/buyers

Most CCAR participants in entity-level inventory GHG reporting are public and private entities based primarily in California, but they may also include participants throughout the US. Project developers, traders and brokers, and retailers may be located anywhere and may have accounts in the Climate Action Reserve without being a CCAR member.

Current project portfolio

At present, only two conservation-based forest management projects in the CCAR portfolio have resulted in more than 200,000 CRTs. The registration of these projects in February 2008 represents the first emission reductions to be verified by CCAR. Additional projects in the forest sector and in other sectors for which CCAR has protocols (i.e. livestock management and landfill gas destruction) are expected to be registered in the near future.

Offset project eligibility

Project types

At present, CCAR only accepts the following GHG mitigation projects:

- *Forestry sector*: conservation or avoided deforestation projects, conservation-based forest management projects involving the harvest and regeneration of native trees, and reforestation projects with native trees on land that has not been forested for at least 10 years;

- *Livestock sector*: projects involving the capture and combustion of biogas in a manure management system for dairy cattle farms, swine farms and other livestock operations;

- *Landfill sector*: gas collection and combustion on-site or off-site.

Project locations

Currently, only forestry projects located in California are eligible for participation in CCAR, while livestock and landfill projects may be located anywhere in the US. All future projects will be able to be located anywhere in the US. The forest protocols are currently being revised for use outside California. They are expected to be released in 2009.[73]

73 G. Gero, personal communication, California Climate Action Registry, spring 2008.

Project size
At present, there are no limitations on project size in any sector.

Start date
For all project types (forestry, livestock management and landfill projects) the start date for project eligibility is January 1 2001.

Crediting period
Distinct crediting periods apply for each project type:

- Livestock management projects that started operating between January 1 2001 and January 1 2008 may choose to begin a 10-year crediting period either at the project start year or in 2008. Projects that started operating after January 1 2008 must use the year their biogas control system started operating as the first year of their 10-year crediting period.

- For landfill projects, the crediting period is either 10 years, or for the period until the project is subject to regulation, whichever is the shorter.

- Forestry projects have a 100-year crediting period and must be verified no less frequently than every six years.

Co-benefit objectives and requirements
It is CCAR policy that GHG projects must not create negative environmental externalities and that projects should result in environmental co-benefits whenever possible. The forest protocols specifically require projects to achieve environmental co-benefits.[74]

Additionality and quantification procedures
Additionality requirements
Additionality requirements are standardized but specified by project type. All projects must demonstrate is that the reductions go beyond what is required by law (regulatory surplus). Additional project-specific requirements are outlined below.

For forest management projects, additionality is defined as practices that exceed the baseline characterization, including any applicable mandatory laws and regulations. In the case of reforestation projects, additionality is further demonstrated by showing that the project area has not been forested for at least 10 years. For conservation projects, it is demonstrated by showing that the project area would have been converted to a non-forest use without the protection provided under the project, and for conservation-based forest management projects the management practices must exceed those of the California Forest Practice Rules.

Livestock management methane abatement projects and landfill gas collection and combustion projects need to pass two tests to demonstrate additionality: a performance

74 G. Gero, personal communication, California Climate Action Registry, spring 2008.

standard test and a regulatory surplus test. For both livestock and landfill projects, the performance standard test is done using a technology-based threshold based on anticipated changes in technology in the sector (e.g. anaerobic digesters for livestock projects, and gas collection and combustion systems for landfill projects). For landfill projects, an additional practice-based threshold is used in the performance standard test – if the landfill was already collecting and combusting landfill gas, it cannot sell this as offsets. Only emissions reductions from a new system added at an existing landfill operation can produce offsets.

Quantification protocols

Standardized baseline quantification and monitoring guidance is included in the project-specific protocols. These requirements are outlined below by project type.

Forestry project baseline scenarios are based on a characterization of the forest management practices that would have occurred in a project's absence.

- *Forest management projects* are evaluated using a baseline that reflects the management scenario resulting from the harvesting and regeneration of trees to the maximum extent permitted by mandatory forest management laws.

- *Reforestation projects* apply a baseline that presumes that without laws or regulations requiring reforestation, the project area would remain without forest cover over the project time period.

- *Forest conservation projects* define the baseline using either local land-use conversion trends identified at the county and state levels, or site-specific immediate threats of conversion.

Forestry project developers must monitor and report emissions from projects annually and submit a report which includes: an estimate of total carbon stocks in the project area, including anticipated or unanticipated changes in the stocks due to disturbances; information on the date, nature and extent of the disturbances, whether anticipated or not; a written assurance from the project developer that the project activities are being carried out; and information describing, quantifying and analyzing any on-site activity-shifting leakage.[75] Project developers are also required to demonstrate that the project is maintaining a consistent amount of additional carbon stocks over time.

Livestock management project baseline scenarios are calculated based on the "continuation of current practices", that is, the technology currently in use for a given geographical area, animal type and farm size. Baseline emissions of methane and

75 A leakage may occur when a project activity changes the availability or quantity of a product or service, resulting in a change in the GHG emissions independent of the project's intended GHG impacts. CCAR differentiates between two types of leakage – activity shifting and market leakage. Activity-shifting leakage is a displacement of activities from within the project's physical boundaries to locations outside of it. Market leakage occurs when the project activity affects an established market for goods, causing substitution or replacement elsewhere resulting in GHG emissions.

CO_2 gases are calculated separately and summed to arrive at the total annual baseline emissions.

Landfill project baseline scenarios include all uncontrolled methane emissions, excluding the portion of methane that would be oxidized by soil bacteria if the project had not taken place and the landfill remained uncovered. Current regulatory requirements for capture of methane emissions can be incorporated into the baseline scenario, as appropriate. Methane emissions from landfill gas capture and control systems must be monitored with measurement equipment that directly meters the continuous rate of landfill gas flow, the fraction of methane in landfill gas, and the temperature and pressure of gas prior to delivery to the combustion device or injection into the natural gas transmission and distribution system. At project sites with an existing methane capture system, specific pre-project installation and post-project installation monitoring of the flow rate and methane concentration of the original system is required to account for any potential overlap of the old and new systems.

Project approval process

Validation and registration

Project developers may use the services of technical assistance providers approved by CCAR as GHG emission consultants. The initial registration forms, known as listing documents, along with a fee are submitted online to CCAR's project registry (the Climate Action Reserve). The proposed project is evaluated by CCAR and may be approved, denied or returned for revisions. If approved, the project is listed on the Climate Action Reserve and is eligible to be verified.

Monitoring, verification and certification

After the project activities are implemented, the project developer may appoint an accredited verifier to verify that the emission reductions or removals have been achieved. Accredited verifiers are independent entities approved by CCAR and the State of California to verify the emission inventories of CCAR members or to verify project activities. The forestry, livestock and landfill verification protocols provide verifiers with guidance on assessing the GHG stocks and emissions associated with projects in these sectors.

Once the project is verified it is submitted online with the verifier's opinion. Once approved by CCAR, the project developer's account in the project registry will be credited with the appropriate number of CRTs. Credits for all project types are issued on an *ex-post* basis after verification has been completed and accepted by CCAR. On payment of the issuance fee, the CRTs may be traded.

Registries and fees

The registry for CCAR projects is the Climate Action Reserve. Project developers, brokers, traders, retailers or members of the public may open an account in the project registry at any time. The annual account fee is USD 500.

Project developers may register a project by paying a USD 500 registration fee and opening a Climate Action Reserve account. The Climate Action Reserve charges an issuance fee of USD 0.15 per metric ton of CO_2e and a transfer fee of USD 0.03 per metric ton of CO_2e.

Selected issues

CCAR has applied the lessons learned from its entity inventory protocols to GHG emission reduction project protocols to help ensure quality and integrity. These lessons include the value of transparency, accuracy, consistency and conservatism in GHG accounting. In doing so, CCAR has adopted standardized and performance-based protocols as the model for its project registry.

With the launch of its Climate Action Reserve, CCAR is positioning itself as a national project registry that sets standards, accredits verifiers, and registers and tracks projects using advanced web-based software to serialize and transfer the issued emission reduction credits. It is anticipated that GHG emission reductions created under the CCAR program may ultimately serve as regulatory offsets under any future California cap and trade program, and that linkages to regional efforts such as the Western Climate Initiative (see section 5.5) are likely.[76]

References

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76 G. Gero, personal communication, California Climate Action Registry, spring 2008.

10 VOLUNTARY GHG ACCOUNTING PROTOCOLS (ENTITY-WIDE AND OFFSET PROJECT-SPECIFIC)

GHG Accounting Protocols provide guidance on definitions of and procedures for accounting for GHG emissions and emission reductions at various levels, including at the entity-wide level and the project level. Unlike offset programs and standards, GHG accounting protocols do not define eligibility criteria or procedural requirements and have no associated regulatory bodies. However, they do form the basis for many offset standards and programs.

This section describes two greenhouse gas (GHG) accounting protocols:

- the World Business Council for Sustainable Development/ World Resources Institute (WBCSD/WRI) Greenhouse Gas Protocol for Project Accounting; and
- the International Organization for Standardization (ISO) standard 14064.

10.1 WBCSD/WRI GHG Protocol For Project Accounting

www.ghgprotocol.org

Overview

Type of standard and context

The WBCSD/WRI GHG Protocol Initiative has developed two separate protocols: the Corporate Accounting and Reporting Standard covers accounting for corporate GHG emission inventories; and the GHG Protocol for Project Accounting (GHG Protocol) is an offset accounting protocol. The latter is a tool for quantifying and reporting GHG emission reductions from GHG mitigation projects and does not focus on verification, enforcement or co-benefits. This section discusses only the *GHG Protocol.*

The GHG Protocol aims to:

- provide a credible and transparent approach to quantifying and reporting project-level GHG emission reductions;
- enhance the credibility of GHG project accounting through the application of common accounting concepts, procedures and principles;
- provide a platform for harmonizing different project-based GHG initiatives and programs.

The protocol was developed by the GHG Protocol Initiative, which was launched in 1998. The initiative was jointly led by the World Business Council for Sustainable Development (WBCSD), a global association of some 200 companies committed to sustainable development, and the World Resources Institute (WRI), an environmental think tank, in partnership with a coalition of businesses, NGOs and governmental and inter-governmental organizations. Numerous companies, organizations and governmental sponsors, including the Energy Foundation, US AID, the US Environmental Protection Agency, British Petroleum, the Chevron Corporation, the Ford Motor Company, International Paper, SC Johnson, Dow and Environment Canada, supported the development of the protocol. The project protocol was finalized and published in December 2005.

Standard authority and administrative bodies

WRI and WBCSD are responsible for developing and updating the protocol and its additions. The protocol can be freely used by anyone and its use is not administered by any organization.

Regional scope

Not applicable.

Recognition of other standards/ linkage with other trading systems

The GHG protocol is not a program in itself but is used by several GHG standards and programs, including ISO 14064-2, the European Union Emission Trading Scheme (EU ETS) and the California Climate Action Registry (CCAR). It has been developed as a flexible tool that can be easily adapted by GHG programs to match their objectives.

Market size and scope

Tradable unit and pricing information

Not applicable.

Standard users

Users of the GHG Protocol include companies, institutions, government agencies, other standards organizations (see above) and project developers.

Current project portfolio

Not applicable.

Offset project eligibility

Project types

The GHG Project Protocol can be used to quantify GHG reductions for any project type. The protocol is supplemented by more specific guidelines for accounting GHG emission reductions in grid-connected electricity and land use, land-use change and forestry (LULUCF) projects.

Project locations
Not defined under the GHG Protocol.

Project size
Not defined under the GHG Protocol.

Start date
Not defined under the GHG Protocol.

Crediting period
The protocol does not specify the duration of the crediting period. It provides the following parameters for project developers to consider in determining a crediting period:

- the pace at which economic conditions, technologies or practices are changing;
- the point at which the underlying assumptions for a project's baseline scenario are likely to change significantly;
- whether the baseline emission estimates are static or dynamic (change over time).

Co-benefit objectives and requirements
The GHG Project Protocol does not address co-benefits such as environmental and social impacts because 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 to incorporate them into the requirements of their program or standards.

Additionality and quantification procedures
Additionality requirements
The GHG Protocol contains no formal requirements for additionality determination but it discusses additionality conceptually as it relates to baseline determination.

Quantification protocols
The GHG Protocol defines the baseline scenario as "a hypothetical description of what would have most likely occurred in the absence of any considerations about climate change". It suggests the following step-wise approach to choosing a baseline scenario:

- identifying possible "baseline candidates," which are alternative technologies or practices within a specific geographic area and time period that could provide the same product or service as the project activity;

- assessing the identified implementation barriers (and optionally, the projected net benefits) of each baseline candidate and the project activity;

- using a comparative analysis to identify the most likely alternative for the baseline scenario.

The Protocol offers further guidance on the use of both project-specific and performance-based standards for estimating the baseline of a project. The protocol recommends use of the performance standard procedure when:

- a number of similar projects are being implemented;

- obtaining verifiable data on project activity alternatives is difficult;

- the project developer intends to keep confidential data that would need to be revealed if a project-specific standard were used; and

- the number of baseline candidates is limited or the GHG emission rate data for baseline candidates are difficult to obtain.

Project approval process

Validation and registration

Not defined under the GHG Protocol.

Monitoring, verification and certification

The GHG Protocol requires a monitoring plan for GHG emissions at the sources or sinks significantly affected by a project. It also requires monitoring of the data underlying key baseline assumptions, and a description of the quality assurance and quality control measures to be employed for data collection, processing and storage.

The guidance provided for developing a monitoring plan allows the use of direct (e.g. smokestack measurements) and indirect (e.g. fuel consumption data) measurements, both of which are subject to uncertainties. It recommends that the project developer be conservative, using data for quantification that reflect the uncertainties and that tend to underestimate the GHG reductions. It further recommends considering costs versus benefits in deciding whether to estimate emissions or monitor them directly.

Verification and certification are not defined under the GHG Protocol.

Registries and fees

Registries and fees do not apply to the GHG Protocol – the GHG Project Protocol is free and publicly available at www.ghgprotocol.org.

Selected issues

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.

References

WRI (2007). The GHG Protocol Initiative. Accessed on November 7 2007, http://www.ghgprotocol.org/

WRI (2006). *GHG Scheme Data Sheet: WRI/WBCSD GHG Protocol for Project Accounting*. Washington, DC: World Resources Institute.

WRI/WBCSD (2005). *The GHG Protocol for Project Accounting*. Washington, DC: World Resources Institute.

10.2 ISO 14064

www.iso.org

Overview

Type of standard and context

ISO 14064 is a policy-neutral, voluntary GHG project accounting standard. It was developed over several years by the International Organization for Standardization (ISO) and launched in the spring of 2006. The standard consists of three parts:

- The first part (14064-1) specifies requirements for designing and developing organization or entity-level GHG inventories.

- The second part (14064-2) details requirements for quantifying, monitoring and reporting emission reductions and removal enhancements from GHG mitigation projects.

- The third part (14064-3) provides requirements and guidance for conducting GHG information validation and verification.

Most of the information below pertains to ISO 14064-2, which presents the following set of principles to guide project developers in GHG project accounting:

- *Relevance*: Select the GHG sources, sinks, reservoirs, data and methodologies appropriate to the needs of the intended user

- *Completeness*: Include all relevant GHG emission and removal, and information to support criteria and procedures

- *Consistency*: Enable meaningful comparisons in GHG-related information.
- *Accuracy*: Reduce bias and uncertainties as far as is practical
- *Transparency*: Disclose sufficient and appropriate GHG-related information to allow intended users to make decisions with reasonable confidence
- *Conservativeness*: Use conservative assumptions, values and procedures to ensure that GHG emission reductions or removal enhancements are not overestimated

ISO 14064-2 provides general guidance and does not prescribe specific requirements. For example, it suggests that additionality be taken into account but does not require a specific tool or additionality test to be used. These requirements are left to be defined by the GHG program or regulation that uses ISO 14064-2. Similarly, it does not focus on secondary benefits.

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 USD 134 (EUR 85) for each of the three standards.

Standard authority and administrative bodies

ISO is the world's largest developer and publisher of International Standards. It is a non-governmental network of the national standards institutes of 157 countries. ISO 14064-1, 2 and 3 are not associated with any program authorities or administrative bodies.

Standards are developed by ISO if a need is perceived by the industry or business community. The requirement is communicated to ISO through one of its national standards institutes and either the work is assigned to an existing technical committee or a new one is created. The technical committee comprises technical and business experts from the industry that has asked for the standard and other experts from national government agencies, testing laboratories, consumer associations, environmentalists and others. All experts are represented at the technical committee as national delegations, and chosen by the respective national standards institutes. Draft standards recommended by the technical committees are adopted if two-thirds of the members actively involved in their development and 75% of the voting members vote in favor. ISO 14064 was drafted by the Technical Committee on Environmental Management and its Subcommittee on Greenhouse Gas Management and Related Activities.

Regional scope

No restrictions are defined under ISO 14064-2.

Recognition of other standards/ linkage with other trading systems

ISO 14064-1, 2 and 3 are intended to be used by GHG programs in conjunction with other regulations or standards. As such, the standard does not define the eligibility criteria per se. For example, the procedures of the Voluntary Carbon Standard (VCS) are based on ISO 14064-2 and 3 and the Canadian GHG Offset Program also plans to use ISO 14064-2 guidelines.

Market size and scope

Tradable unit and pricing information

Not applicable.

Standard users

Both the voluntary and the compliance programs have incorporated the ISO guidelines into their program design.

Current project portfolio

Not applicable.

Offset project eligibility

Project types

No restrictions are defined under ISO 14064-2

Project locations

Not defined under ISO 14064-2.

Project size

Not defined under ISO 14064-2.

Start date

Not defined under ISO 14064-2.

Crediting period

Not defined under ISO 14064-2.

Co-benefit objectives and requirements

These requirements are listed in only general terms. For example, an Environmental Impact Assessment (EIA) is required if the host country or region requires the completion of such an assessment. ISO 14064-2 also specifies that relevant outcomes of stakeholder participation have to be presented.

Additionality and quantification procedures

Additionality requirements

ISO 14064-2 contains no specific requirements for additionality determination but offers general guidelines. The guidelines for additionality tools generally assume a project-specific approach. However, the requirements of the GHG program take precedence

over specific ISO 14064-2 requirements, which allows performance standards to be used where this is prescribed by the GHG program.

Quantification protocols

ISO 14064-2 does not prescribe baseline procedures, but instead offers general guidance on and sets out general requirements for how to determine a project baseline.

Project approval process

Validation and registration

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, then the project proponent has to decide on the type of validation and/or verification (first-, second- or third-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, which is usually made by the project proponent. ISO 14064-3 specifies the principles and requirements for validation and verification of GHG assertions (ISO 2006b).

Under ISO 14064-2, the use of third-party auditors is strongly recommended, but only required if GHG emission reductions are to be made 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 2006c). The validation and verification requirements are outlined together and there are few distinctions between the two.

Monitoring, verification and certification

ISO verification requirements are included in the section above.

ISO defines monitoring criteria in general terms. For example, it states that 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". It also states that project proponents must identify and justify which GHG sources, sinks and reservoirs will be monitored.

The monitoring guidelines provide guidance on the following:

- the purpose of monitoring;
- the types of data and information to be reported, including units of measurement;

- the origin of the data;
- monitoring methodologies, including estimation, modelling, measurement or calculation approaches;
- monitoring times and periods, considering the needs of intended users;
- monitoring roles and responsibilities; and
- GHG information management systems, including the location and retention of stored data (ISO, 2006b).

Registries and fees

Not applicable

Selected issues

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 several regulatory and voluntary schemes. Because it is not specific in its requirements and leaves many issues undefined, it is of limited use as a tool by itself.

References

ISO (2008). *International Organization for Standardization*. Available at, http://www.iso.org/iso/home.htm.

ISO (2006a). Greenhouse gases, Part 1: *Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. ISO 14064-1. Available at http://www.iso.org.

ISO (2006b). Greenhouse gases, Part 2: *Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.* ISO 14064-2. Available at http://www.iso.org/iso.

ISO (2006c). Greenhouse gases, Part 3: *Specification with guidance for the validation and verification of greenhouse gas assertions*. ISO 14064-3. Available at http://www.iso.org.

11 VOLUNTARY STANDARDS FOR OFFSET PROJECTS

To address concerns related to the quality of carbon offset projects and offset retailers, in recent years over a dozen voluntary offset standards have been developed to provide offset programs and projects with a means to assure quality to buyers. Standards in the carbon offset market have an especially high value because the market has many features and presents many concerns that are difficult for buyers to evaluate.

There are three core components of a carbon offset standard:[77]

- *Accounting standards*: which ensure that offsets are "real, additional, and permanent". These include definitions of and rules on the elements that are essential during the design and early implementation phase of a project. They can include =additionality and baseline methodologies, definitions of accepted project types and methodologies, and methodologies for validating project activities.

- *Monitoring, Verification and Certification Standards*: which ensure that offset projects perform as they were predicted to 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.

- *Registration and Enforcement Systems*: which clarify ownership, enable trading in offsets and ensure that carbon offsets are only sold once. These must include a registry with publicly available information to uniquely identify offset projects and a system to transparently track ownership of offsets.

The sections below profiles four voluntary standards for offsets in more detail:

- Gold Standard (GS)
- Voluntary Offset Standard (VOS)
- Voluntary Carbon Standard 2007 (VCS 2007)
- Green-e Climate Protocol for Renewable Energy
- Green-e Climate Program

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

11.1 Gold Standard

http://www.cdmgoldstandard.org

Overview

Type of standard and context

The Gold Standard (GS) is a voluntary carbon offset standard for renewable energy and energy efficiency projects. The GS can be applied to voluntary offset projects and to Clean Development Mechanism (CDM) projects. It was developed under the leadership of the World Wildlife Fund (WWF), with a focus on offset projects that provide lasting social, economic and environmental benefits.

The GS CDM was launched in 2003 after a two-year period of consultation with stakeholders, governments, non-governmental organizations (NGOs) and private sector specialists from over 40 countries. The GS Verified Emission Reduction (VER) standard was launched in 2006. The GS is presently endorsed by over 60 environmental and development NGOs. It is financed by donors and by income from issuance fees and franchising fees. The stated goals of the GS are:

> "to help the CDM achieve its twin objectives of reducing compliance costs through project-based emission trading while at the same time fostering sustainable development in developing countries without generating additional emissions.

In the voluntary market, the *Gold Standar*d guarantees that offsetting emissions is not a zero-sum PR stunt, but real engagement with real impact.

The objectives of the Gold Standard Foundation are to:

- help boost investment in additional sustainable energy projects
- ensure significant and lasting contributions to sustainable development
- provide assurance that investments have environmental integrity
- increase public support for renewable energy and energy efficiency" (Gold Standard, n.d.).

Standard authority and administrative bodies

The Gold Standard Foundation is a non-profit organization. The operational activities of the GS are managed by the Gold Standard secretariat, and include capacity building, marketing, communications, certification, registration and issuance, as well as maintenance of the GS rules and procedures. The secretariat currently has a core staff of five.

The Foundation Board oversees the strategic and organizational development of the GS. The Board currently has seven 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 GS rules and procedures, the Board decides whether a Gold Standard NGO supporter majority is necessary to implement the change.

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

The Gold Standard NGO Supporters officially endorse the practices of the GS method and approve major rule changes (e.g. eligibility of project types). Gold Standard NGO Supporters are consulted as part of the GS stakeholder consultations and are invited to take part in the project review process. They may also request an in-depth audit of GS projects at both the registration and the issuance stage.

The Gold Standard Auditors are UNFCCC accredited Designated Operational Entities (DOEs) who carry out validation and verification of GS projects. DOEs are not allowed to carry out the validation and the verification of the same project, except for micro- and small-scale projects.

Regional scope

The GS is an international voluntary carbon offset standard. As of spring of 2008, all GS projects have been implemented in non-annex 1 countries.

Recognition of other standards/ linkage with other trading systems

The GS does not recognize any other voluntary standards, but the GS is recognized by the VOS and Green-e Climate. It is likely to be recognized by several other standards (e.g. VER+ and VCS) in the near future.

Market size and scope

Tradable unit and pricing information

Gold Standard CERs and Gold Standard VERs are sold in units of 1 metric ton of CO_2e.

GS certified CERs and VERs fetch an average price premium of 5–25% above regular CERs and 20–100% above comparable VERs.[78] The premium varies depending on a number of factors: the project itself (e.g. its attractiveness for communication), the

78 C. Sparks, personal communication, the Gold Standard, spring 2008.

project location (e.g. projects in least developed countries are highly sought after), whether a trade happens in the wholesale or in the retail market, the vintage of the credits, pre-payments and the risk distribution between buyer and seller, among other factors.

Standard users, participants and buyers

GS Credits are purchased by buyers who place a high value on environmental integrity and strong co-benefits. These are buyers from the compliance market and voluntary buyers, such as NGOs, large corporate entities with strong Corporate Social responsibility (CSR) profiles, businesses and offset retailers.

Current project portfolio

As of July 2008, five VER and six CDM/Joint Implementation (JI) projects have been registered under the GS (Gold Standard, 2008). The GS is growing rapidly. As of September 2008, the Gold Standard Registry included more than 200 projects in various stages of approval, representing projects in over 30 countries. Of these, approximately 100 projects have completed their stakeholder consultations.[79]

Offset project eligibility

Gold Standard version 2 was released in July 2008. The GS Requirements ("Requirements") present the fundamental principles and the rules of the GS certification in a concise way. The Requirements provide an "at a glance" overview of the basic certification criteria for validators and project developers. The Gold Standard Toolkit describes the project cycle and provides examples and detailed instructions on the use of the GS. Based on experiences and recurring queries, the Toolkit will be updated to include the most relevant examples and guidance. The Toolkit comes with fixed templates (annexes) that are easily used to report information being passed between project proponents, validators, verifiers and the GS. All GS-related documents can be downloaded from the 'Technical Documents' section of the GS website at http://cdmgoldstandard.org/materials.php.

Project types

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

Project locations

GS VER projects cannot be implemented in countries with an emission cap, except if GS VERs are backed by Assigned Amount Units (AAUs) being permanently retired.

Project size

The GS does not set a minimum project size. For GS CERs, CDM project size limits apply. Project size requirements for GS VERs are:

79 Current project portfolio information changes rapidly. For the latest information see the Gold Standard Registry, http://goldstandard.apx.com.

- micro-scale (<5,000 tons CO_2 per year),
- small-scale (5,000–60,000 tons CO_2 per year) or
- large-scale (>60,000 tons CO_2 per year).

Start date

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

The GS does certify CDM pre-registration credits for a maximum of one 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 was submitted for validation to the DOE prior to January 31 2008.
- The DOE must provide a verification report covering the GS VER period either with the first verification of GS CERs or separately.
- The reasons for the delay between the start of project operation and the CDM registration have to be explained by the DOE as part of the verification report covering the GS VER period.

GS CERs will only be issued after the project has been successfully registered as a GS CDM project. Once the project has been registered as a GS CDM project, the normal GS rules apply.

Crediting period

Crediting periods are either one 10-year period or three renewable seven-year periods, except for validated pre-CDM GS VERs (see above).

Projects can opt-in to GS crediting during the overall crediting period by submitting a GS-compliance verification report to the GS. Projects can opt-out of GS crediting during the overall crediting period, but opt-out is final and the project can no longer be communicated as a GS project.

Prior to opt-in and after opt-out, projects are permitted to seek issuance of credits from other standards. However, projects are not permitted to apply for the issuance of credits under different standards if this results in extending the overall crediting period of the project beyond the GS VER rules.

Co-benefit objectives and requirements

Both GS CER and GS VER projects must show clear sustainable development co-benefits, including environmental, social and economic benefits, 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 as well as mitigation or compensation measures are monitored over the entire crediting period, and that information on the status of the indicators is included in the verification reports.

Both the project developer and the stakeholders consulted assign scores of between –2 (a major impact that cannot be mitigated) and +2 (a major positive impact) to a broad set of predefined indicators covering all aspects of sustainable development. Scoring depends on the specific circumstances. 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 VER and CER for both 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 if stakeholders have concerns about environmental impacts for which no mitigation measures can 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.

The GS requires two public consultation rounds for all projects (except micro-scale projects, which require one initial consultation only during the design phase of the project). VER projects require a letter to the Designated National Authority (DNA) or, if no DNA exists, another relevant authority to communicate the development of the project as a GS voluntary offset project.

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

Additionality and quantification procedures

Additionality requirements

The additionality requirements for both GS CERs and GS VERs are project-based and bottom-up. The GS requires the application of the latest UNFCCC additionality tool. In addition, previous announcement checks are required for both CER and VER projects.

Quantification protocols

GS CDM projects can only use CDM EB-approved methodologies, which are bottom-up and project-based. GS VER projects can choose to use the baseline methodologies approved by the Methodology Panel of the CDM EB, the CDM Small Scale Working Group, or the United Nations Development Program Millennium Development Goals'

Carbon Facility. If no suitable methodology exists, GS VER projects can propose a new protocol to be approved by the GS-TAC at a fixed cost paid by the project developer. The fees are USD 2,500 for small- and large-scale projects and USD 1,000 for micro-scale projects. Methodologies for the deployment of a fleet of small-scale biodigesters, as well as for energy efficient cooking stoves have so far been approved and implemented and others are under review.

Project approval process

Validation and registration

Projects are approved by the GS-TAC after it has reviewed and agreed all the required documentation. CER projects must additionally go through the CDM approval process. In general, the validation requirements for GS VER and GS CER projects are identical, but for VERs some requirements of the CDM have been simplified or removed. These include:

- simplified guidelines for micro-scale projects;
- broader eligibility of host countries;
- less stringent rules on the use of official development assistance (ODA);
- broader scope of eligible baseline methodologies;
- no need for formal host country approval.

All GS projects must be validated by a DOE. The GS provides support to DOEs in the form of a validation manual for each VER and CDM stream. The key validation requirements for GS projects are:

- a stakeholder consultation report;
- a completed PDD with the baseline and monitoring methodology and the sustainable development matrix;
- a Validation Report;acceptance of the GS Terms and Conditions.

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

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). The GS TAC uses a “targeted random” selection method to select projects for validation and verification. Actual validations

and verifications performed by DOEs will be paid for via the GS validation and verification funds. Projects not selected for DOE validation and verification in this approach are validated and verified by the GS in-house, but may be required to undergo DOE verification in later years.

Monitoring, verification and certification

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

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

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

- crucial for the overall positive impact on sustainable development;
- particularly sensitive to changes;
- generating stakeholder concerns.

Registries and fees

The GS Foundation launched an independent registry operated by APX Inc. in mid-March 2008 (http://goldstandard.apx.com). The registry tracks ownership transfers of GS VERs in the voluntary carbon market. It is a proprietary registry and the GS Foundation is the only entity to issue credits. CERs are registered in the CDM registry and will be tracked in the GS registry as well. The GS registry includes the GS Project Database and manages the transfer of documents during the certification process. The public has access to a number of reports and to project information.

The GS does not engage in project or credit transactions. The GS registry makes it possible to track the number of retired GS VERs and to review the number of GS VERs issued. However, buyers and intermediaries between the point of issuance and the point of retirement remain unknown to the GS. The ownership of retired credits can be made public if desired.

The GS charges an issuance fee of USD 0.01 for CERs and USD 0.10 for VERs. No registration fee is charged. Separate fees are charged by the GS VER registry operators: USD 0.05 at issuance and USD 500 per year for all accounts except for those of project owners. The USD 500 fee includes trading transactions of 50,000 credits per year, after

which every trade is charged at USD 0.01 per credit. No fees are charged to transfer the credits out of a project owner's account.

Projects that are already operational may apply for retroactive registration to the GS. For this, they need to go through a feasibility pre-assessment process for which the GS 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 USD 250).

Selected issues

The GS is generally accepted as the standard with the most stringent quality criteria. It is the only voluntary standard that has:

- clearly defined additionality rules;
- third-party auditing; and
- a project approval body similar to the CDM EB.

Transparency

The GS has an extensive project database that contains details of all GS projects. All methodologies and GS forms are also available to the public on the website.

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 before filling in the GS SD matrix.

The CDM has a rather poorly defined process for involving stakeholders (Kollmuss *et al*., 2007). The GS has improved on this process by developing clear and detailed definitions of the stakeholder consultation process.[80]

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 and providing further guidance.

Complex documentation

The GS sets more demanding requirements and has more complex documentation. This makes validation and verification more complicated, time-consuming and, at times, expensive. Some project developers might decide that the higher income from GS CERs and VERS (over uncertified CERs or VERs) does not justify the extra work.

80 However, the project types eligible for the GS generally do not face serious concerns from stakeholders. It is much more important to improve stakeholder consultation over other CDM projects, such as large hydro-projects.

Limitation of project categories

The GS only recognizes offset reductions from renewable energy and energy efficiency projects. This is potentially limiting, since these 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 program covering the electricity generation sector, generating US domestic offsets from these types of projects would no longer be possible, although the GS could potentially be recognized and grandfathered into a US compliance scheme.

In addition, given the large contribution that deforestation makes to climate change, it would seem important to add bio-sequestration projects, especially since the GS, with its focus on high-quality offsets with secondary benefits, could play an important role in ensuring quality in this sector. In collaboration with the environmental NGO WWF, preliminary research into such a change of scope is currently underway as part of WWF's Forest Carbon Initiative.[81]

The future of the GS

It remains to be seen whether the GS, which is currently a small organization, will be able to certify large quantities of emission reductions. It seems likely that the GS will only be successful on a larger scale if more project developers become aware of the price premium paid for GS credits and become versed in developing GS projects. The new GS version 2 streamlines much of the GS documentation. It is now easier for potential project developers to access the required information.

References

Gold Standard (2007). *The Gold Standard Brochure*. Available at http://www.cdmgoldstandard.org.

Gold Standard (n.d.). Objectives, http://www.cdmgoldstandard.org/objectives.php.

11.2 Voluntary Offset Standard

http://www.carboninvestors.org/

Overview

Type of standard and context

The Voluntary Offset Standard (VOS) is a voluntary carbon offset standard that requires Gold Standard VER or CDM procedures for its projects.

International Carbon Investors and Services (INCIS) launched the VOS in June 2007. INCIS is a non-profit association of large investment companies that provide carbon-related investments and services. As of November 2007, INCIS had 26 members. The VOS is financed though INCIS membership fees and will be further financed through issuance fees once its registry is established. According to the VOS:

81 C. Sparks, personal communication, the Gold Standard, spring 2008.

> The Voluntary Offset Standard is intended to support the development of emerging carbon markets around the world, particularly those of a 'precompliance' nature, and support international policy convergence with a view to long term carbon market integration.
>
> In 2003, private banks agreed to adopt environmental and social standards for project financing that were equivalent to those applied by multilateral development banks. The objective of the Equator Principles was to avoid what civil society would characterise as a 'race to the bottom' in standards, in which private banks would undercut the lending criteria of multilateral institutions by disregarding procedures designed to deliver socially responsible investment and sound environmental management practices. The aim of the Voluntary Offset Standard is to fulfil the same objective for the carbon market. (INCIS, 2007)

Standard authority and administrative bodies

UNFCCC approved DOEs serve as program auditors, and conduct project verification and approval of projects under the VOS standard. INCIS staff and Board Members serve as the administrative body for the VOS.

Regional scope

The VOS is an international voluntary standard.

Recognition of other standards/ linkage with other trading systems

The VOS accepts credits from CDM, JI and the GS CER and VER projects.

INCIS may decide to permit other VER standards (or specific methodologies approved under these additional standards) to be recognised under the VOS in the future.

Market size and scope

Tradable unit and pricing information

VOS-certified VERs are measured in units of 1 metric ton of CO_2. No pricing information is currently available.

Standard users

Buyers are generally large voluntary customers based in Europe.

Current project portfolio

No information is available on how many projects have been implemented. The VOS relies on DOE certification and there will be no central point to collect VOS project portfolio information until a registry has been established.

Offset project eligibility

Project types

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

Project locations

There are no project location restrictions under the VOS. However, project activities based in any country that is covered by a greenhouse gas (GHG) emission allowance trading scheme, such as the European Union Emission Trading Scheme, are excluded if there is no mechanism in place to retire the equivalent numbers of allowances in that country (e.g. retiring of AAUs).

Project size

CDM/JI requirements apply.

Start date

CDM/JI requirements apply. VERs from CDM pre-registration credits 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 requirements, and the number of VERs has been verified by a different DOE.

Crediting period

CDM/JI and GS requirements apply.

Co-benefit objectives and requirements

CDM/JI and GS requirements apply.

Additionality and quantification procedures

CDM/JI and GS requirements apply.

Project approval process

Validation and registration

For GS VERs, validation is done through the GS; and for CDM standard VERs, validation is done through DOE certification.

Monitoring, verification and certification

For GS VERs, verification is done through the GS; and for CDM standard VERs, verification is done through DOE certification.

Registries and fees

The VOS is planning to establish its own registry. Registry costs have not yet been determined.

Selected issues

The VOS standard is supported by many of the heavyweights 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. The support of these powerful financial players means that the VOS could potentially play an important role (Kollmuss *et al*., 2007).

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 GS offsets. In terms of VER projects implemented using CDM methodologies, the VOS is similar to the VER+, but has fewer defined organizational structures and procedures. What the decision-making structures for approval of methodologies or other standards will look like is still unclear . For these reasons, it is unclear how important a role the VOS will play in the voluntary offset market.

References

INCIS (2007). International Carbon Investors and Services, http://www.carboninvestors.org/documents.

11.3 Voluntary Carbon Standard 2007

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

Overview

Type of standard and context

The Voluntary Carbon Standard 2007 (VCS 2007) 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 and projects consultants).

The 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 (WEF) Global Greenhouse Register. 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 (WBCSD) joined in 2007 as a founding partner of VCS 2007. The VCS will be updated yearly for the first two years and every two years after that.

Start-up funding for the VCS Standard Organization comes from the Climate Group, the IETA, and the WBCSD, and additional fundraising is currently underway. Donations from commercial organizations are capped at USD 31,600 (EUR 20,000) per year. In the medium term, costs will be covered by levy charged at the point of VCU issuance.

Standard authority and administrative bodies

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

The 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.

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

The Technical Advisory Groups (TAGs) support the Board by providing detailed technical recommendations on issues related to the program 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 offset projects, validate new baseline and monitoring methodologies, validate additionality performance standards and perform gap analyses of other GHG programs. They can only do this for the project scopes and geographies for which they are accredited, and they must be accredited either under an approved GHG Program or under the ISO 14065:2007 with an accreditation scope specifically for the VCS Program. Unlike the CDM, accredited third-party auditors can validate and verify the same project and give final project approval.

Regional scope

The VCS is an international voluntary GHG offset standard.

Recognition of other standards/ linkage with other trading systems

In early 2008, the VCS Program recognized the CDM and JI, and it is in the process of evaluating the California Climate Action Registry (CCAR). The VCS will evaluate and either fully adopt or adopt elements of other offset standards by commissioning a validator to complete a detailed gap analysis of the two programs. The approval process will be based on the principle of full compatibility with the VCS program. 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).

Market size and scope

Tradable unit and pricing information

VCS-approved carbon offsets are registered and traded as Voluntary Carbon Units. One VCU represents emission reductions of 1 metric ton of CO_2. VCUs verified under VCS version 1 trade for between USD 8 and USD 24 (EUR 5–15).[82]

Standard users

VCS 2007 is expected to be used widely for the verification of VERs for the European and North American markets.

Current project portfolio

VCS 2007 was launched in November 2007, so 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 and 150 projects, creating between 10–20MmtCO_2e of offsets, will be approved under the VCS Program by the end of 2008.[83]

Offset project eligibility

Project types

All project types are allowed under the VCS Program provided that they are supported by an approved VCS methodology or are part of an approved GHG Program. Exceptions include 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. a Renewable Energy Certificate). Renewable Energy Credits (RECs) are fungible with VCUs if the GHG Program 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 program operator to confirm that the credit has not been used under the relevant program and has now been cancelled to prevent future use.

Project locations

There are no project location restrictions for the VCS. Retirement of corresponding AAUs is required for projects in Annex-1 countries that are signatories to the Kyoto Protocol.

82 J. Harris, personal communication, Voluntary Offset Standard, spring 2008.

83 J. Harris, personal communication, Voluntary Offset Standard, spring 2008.

Project size

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

- micro-projects: under 5,000 metric tCO_2e per year;
- projects: 5,000–1,000,000 $mtCO_2e$ per year;
- mega projects: greater than 1,000,000 $mtCO_2e$ per year.

The rules on validation and verification vary slightly depending on the project size category.

Start date

The earliest project start date permissible under the VCS is January 1 2002. For the first year of operation, projects that started anytime after January 1 2002 were accepted provided they completed the validation process by November 19 2008. After the first year, only those projects that started less than 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.

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

Crediting period

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

Co-benefit objectives and requirements

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" (VCS Secretariat, 2007).

Additionality and quantification procedures

Additionality requirements

The VCS uses project-based, performance-based and positive technology list-based additionality tests. The project-based tests closely follow the CDM Additionality Tool procedures:

Step 1: Regulatory surplus test – 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 barriers test – the project must demonstrate that it faces either capital and 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 test – 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 order to demonstrate these 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 Program 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 technologies were included in the positive list. The list is currently under development.

Quantification protocols

The VCS accepts projects that use existing quantification methodologies approved either under the VCS Program or by another approved GHG Program, and it also approves new methodologies. At the time of the VCS 2007 launch, all CDM baselines and monitoring methodologies had been approved for use under the VCS and methodologies from CCAR were under consideration.

For the most part, the VCS draws on guidelines provided in ISO 14064-2 to guide the development of a VCS Program Methodology (see section 10.2 on ISO 14064). The VCS Board approves 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 among the two auditors and rejects it if there is disagreement between them. The project developer can appeal the decision. If the decision is appealed, the VCS Secretariat appoints an independent consultant to review the project proponent's claim. The VCS Board makes a final decision based on the review. The expenses for each review are paid by the project proponent.

Project approval process

Validation and registration

Validation is required under the VCS, but this 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 Program or of a VCS-approved GHG Program to validate the project. The auditor evaluates the project against the VCS validation requirements (see below) and prepares its report according to 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, on 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.

Project validation requires projects to meet ISO 14064- 3 validation requirements and to prepare a validation report that follows the VCS Validation Report template and includes:

- a description of the project design;
- a description of the method used to calculate the baseline;
- a monitoring plan;
- a calculation of the GHG emission reductions;
- a calculation of the environmental impact;
- comments by stakeholders.

Monitoring, verification and certification

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. Instead, the auditors who verify the projects approve the claimed emission reductions. The third-party auditor verifies the emission reductions and the accuracy of emission reduction calculations as per the requirements of ISO 14064-3. 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 made publicly available.

A verification report is prepared following the same requirements as for the VCS Validation Report template.

Registries and fees

Vcs registries

All VCUs are issued, held and cancelled in VCS registries. The VCS has approved four registries - APX Inc., Bank of New York Mellon, Caisse des Depots and TZ1. The registries will go live in late 2008. No registry is allowed to issue VCUs before then.

Project database

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 assigns a serial number to each project. The project database is under development and will be launched in late 2008. 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 also submit the following to the VCS:

- a letter confirming that the VCUs being registered have not been registered, transferred or retired previously;
- if emission reductions occurred in an annex-1 country, a certificate from the national registry of the host country stating that an equal number of AAUs have been cancelled from that registry;
- emission reductions from renewable energy projects must show proof that they are not a result of activity to meet a regulatory renewable energy commitment or to generate Renewable Energy Certificates (or the RECs must be cancelled).

The registration fee for each VCU issued was USD 0.06 (EUR 0.04) as of November 2007. Account fees will be set by each of the VCS approved registries.

Selected issues

The VCS was developed through a lengthy stakeholder process. It aims to strike a balance between simplifying procedures and keeping costs for project developers low, and ensuring the integrity of offsets. In some areas the VCS is quite innovative. This is especially true for its standard on bio-sequestration projects:

VCs agriculture, forestry and other land use

The VCS Agriculture, Forestry and Other Land Use (AFOLU) rules are thorough and innovative in the way they address permanence concerns. Permanence issues are addressed through detailed rules on buffers, which include set asides sized for each project based on the determined level of risk. The VCS is the first carbon offset standard to cover all the major land use activities under a single verification framework. Only once projects have been fully implemented will it be possible to fully evaluate the quality of the standard.

Reducing transaction costs versus ensuring integrity

To keep costs for validation and verification low and to simplify procedures, the VCS outsources 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 administration of the VCS can be kept very lean. Outsourcing tasks to professionals in their respective fields can potentially also increase the quality of work (e.g. a proposed methodology is 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.

Specific concerns related to the VSC are outlined below.

No separation of verification and approval of projects

Under the VCS, it is the auditors who approve the projects. Given the pressures on auditors and given the conflict of interest (Schneider, 2007), the lack of an accrediting board to review projects and give final project approval could be a potential weakness of the VCS. A double approval process for projects, similar to that which the VCS uses for methodology approval, could be a solution to this potential problem.

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 experience under 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. The 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).

The VCS plans to add benchmark tools and technology lists to its additionality tests. 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. Nonetheless, 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. Ideally, a conservative approach will be developed 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 GS (three times for seven years). Extending the crediting period means that fewer emission reduction projects are necessary to create the same number of emission reductions. In other words, there is a trade-off between limiting crediting periods to a minimum to allow more projects to enter the market and extending it to a 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.

Co-benefits

The VCS requirements for stakeholder involvement are based on ISO 14064-2, which states these in only very general terms. Definitions of stakeholders, confidential information[84] and 'sufficient opportunity' for comments appear to be left to the project developer to decide. Nor are there specific procedures and rules on how stakeholder concerns are to be taken into consideration. For buyers who place value on these co-benefits, the VCS would not be a sufficient standard.

Quality control of auditors' work

One year after the launch of VCS 2007, the VCS will conduct an external review of all the projects that have been certified. This work is likely to be carried out by a commissioned NGO. The 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 third-party auditors, although the VCS board has the authority to sanction auditors, project developers or registry operators "based on evidence of an improper behavior" (VCS Secretariat, 2007).

The future of the vcs

Given that the VCS 2007 is broadly supported by the carbon offset industry, it is likely to 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 too vague. The VCS 2007 was developed after a two-year stakeholder consultation and has taken into account many of these criticisms. It is clearly an improvement on version 1. It is to be hoped 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.

References

VCS (n.d.). Voluntary Carbon Standard, http://www.v-c-s.org/

VCS Secretariat (2007). *Voluntary Carbon Standard Program Guidelines*. VCS. November 2007, available at: http://www.v-c-s.org/docs/Program%20Guidelines%202007.pdf.

84 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).

11.4 Green-e Climate Protocol for Renewable Energy

http://www.green-e.org/getcert_ghg_re_protocol.shtml

Overview

Type of standard and context

The Green-e Climate Protocol for Renewable Energy (Green-e CPRE) is part of Green-e Climate (see section 11.5) a certification program for carbon offsets sold to consumers in the voluntary offset market. All **Green-e programs** are administered by the Center for Resource Solutions (CRS),[85] a non-profit organization based in California (see section 11.5).

The Green-e Climate Protocol for Renewable Energy (Green-e CPRE) is a voluntary GHG offset protocol that certifies eligible renewable facilities in the US to sell GHG offsets.

> The intention of this Protocol is to bring additional credibility to the market for GHG emission reductions derived from renewable energy project activities. By establishing clear guidelines, informed by stakeholders, on the greenhouse gas claims that can be made from renewable energy projects, the Protocol will help further the development of the voluntary market for renewable energy. The Protocol addresses the issues of tracking, additionality, double counting and double claiming in order to ensure that the greenhouse gas benefits from eligible renewable energy projects are real, surplus, measurable, verifiable and additional (Green-e, 2007).

Standard authority and administrative bodies

The Green-e CPRE is governed by the Green-e Governance Board and administered by the CRS. The Green-e Governance Board is comprised of environmental organizations and offset market experts. To avoid conflicts of interest, market actors do not have a vote but they are represented through a non-voting seat.

Regional scope

The Green-e CPRE is specific to projects in the electricity sector in the US.

Recognition of other standards/ linkage with other trading systems

The Green-e CPRE is part of the Green-e Climate program.

Market size and scope

Tradable unit and pricing information

Green-e Climate certified VERs are in units of 1 ton of CO_2e (metric or short ton according to the program certified.) There is no pricing information currently available.

85 More information about the CRS is available at http://www.resource-solutions.org.

Standard users
Buyers of Green-e Climate certified offsets are individuals, organizations and companies in the US.

Current project portfolio
There is currently no project portfolio information available for Green-e CPRE. It is likely that only a few facilities have been certified as the protocol was launched only recently.

Offset project eligibility
Project types
The following project types are accepted under the Green-e CPRE:

- wind power;
- solar photovoltaics (PV) and solar thermal electric power;
- hydropower from either new generation capacity (see start date) on a non-impoundment, or new generation capacity on an existing impoundment, must meet one or more of the following conditions:
    - The hydropower facility is certified by the Low Impact Hydropower Institute; or
    - The facility is a run-of-the-river hydropower facility with a total rated nameplate capacity equal to or less than 5 MW. Multiple turbines will not be counted separately and cannot add up to more than a 5 MW nameplate capacity; or
    - The hydropower facility consists of a turbine in a pipeline or a turbine in an irrigation canal;
- geothermal electric generation facilities with no direct emission of GHGs;
- gaseous biomass from landfill gas methane, wastewater methane and digester methane derived from waste biomass fuels used to generate electricity. No biomass in a liquid or solid state will be allowed. Animal waste in a solid state, agricultural biomass, energy crops, municipal solid waste and waste to energy are ineligible;
- ocean thermal, wave and tidal power.

New and emerging technologies not included in the above list will be considered on a case-by-case basis by the Green-e Governance Board.

Project locations
Projects must be located in the US.

Project size
Hydropower facilities have to be smaller than 5 MW or be certified by the Low Impact Hydropower Institute. No size restrictions apply for other project types.

Start date
Eligible facilities cannot have been operational before January 1 2005.

Crediting period
The maximum crediting period is 15 years.

Only GHG reductions resulting from generation of renewable energy that occurred on January 1 2007 or later are eligible. In addition, a Green-e certified products may include only GHG reductions from renewable energy generation that occurred in the calendar year in which the product is sold, the first three months of the following calendar year or the last six months of the prior calendar year.

Co-benefit objectives and requirements
In general, the Green-e CPRE does not require any additional co-benefits of the projects that seek certification. The exceptions are the Low Impact Hydropower Institute certification requirements of hydro projects.

Additionality and quantification procedures
Additionality requirements
The Green-e CPRE uses a top-down approach and requires three additionality tests:

- the legal, regulatory or institutional test;
- the timing test (see "Start date" above); and
- the performance and technology test.

The Legal, Regulatory or Institutional Test:
The Renewable Facility is NOT eligible if:

- it was mandated by a local, state or federal government agency or was required under any legal requirement or settlement;
- it was built as a least-cost facility when compared with non-renewable energy facilities.

  However, if a marketer or generator can demonstrate to the Green-e Governance Board that the revenue from the sale of RECs or GHG credits was a determining factor in the facility being determined the least-cost option the facility is eligible for certified GHG reductions. The demonstration that the sale of RECs or GHG emission reductions deemed a facility least cost under an Integrated Resource Planning (IRP) process is only required for least-cost facilities under an IRP

process. Green-e Climate is not requiring a financial additionality test on project eligibility (Green-e, 2007).

- it is located within a legally binding GHG cap set for the electricity sector. The annual Green-e Climate recertification process will include verification that the facility still satisfies the Legal and Regulatory Test. Furthermore, regulatory changes may also trigger revisions to the Protocol itself;

- the owner of a renewable generation facility is reporting direct GHG emissions in a legally binding cap and trade program.

- if allowances are allocated to the facility, the allowances must be retired on behalf of the purchaser in order for the facility to be eligible under this protocol. A facility that sells a share of its RECs in compliance markets is eligible for GHG emission reductions from the remaining share of its generation provided that it meets all the requirements of this protocol.

The Performance and technology test:
The Green-e CPRE uses a sector-based performance and technology test to identify whether a specific technology (in this case net-zero GHG emitting electricity generation) is an additional activity in the US. This sector-based approach is similar to the approach used by CCAR and the US Environmental Protection Agency (EPA) Climate Leaders program for their offset protocols.

Quantification protocols

The Green-e Climate CPRE uses a top-down approach.

The emission reductions are calculated using a regional Baseline Emission Rate (BER). For baseload technologies (i.e. firm power activities including biomass, geothermal, ocean thermal and hydro), the BER reflects the emission rates of the planned capacity additions in the US (build margin[86]) and for non-baseload technologies (i.e. non-firm power activities including solar, wind, wave, and tidal), the BER is an average of the emission rates of the build margin and the currently operating grid connected electricity generation facilities (operating margin).[87] Baseload emission rates are developed for different regions.[88] The non-baseload rate used has been developed by the US EPA eGRID program. The BER will be updated at least every three years and posted on the Green-e Climate website.[89]

86 The build margin (BM) represents the emissions reduction that occurred because the renewable generation was built instead of a business-as-usual plant.

87 The operating margin (OM) estimates the effect of backing down other generating facilities when the renewable energy facility is operating and generating power.

88 For details of the NERC regions see http://tinyurl.com/4u8r2z.

89 For details see the Green-e Climate Protocol for Renewable Energy http://tinyurl.com/4lsknp, p.9.

Project approval process

Validation and registration

Every project approved under the Green-e CPRE has to go through an initial review, which establishes that the project meets the requirements of the Green-e CPRE. Depending on the characteristics of the facility, this can include site visits, specific reporting procedures to GHG registries, siting documents and/or contractual requirements; as well as details of how the project addresses additionality, and other specifics of the facility being added to the Green-e Climate website.

Monitoring, verification and certification

Since the Green-e CPRE establishes common factors for each technology type dependent on the region in which it is located, the emission reductions can be directly calculated from the electricity generation. To address the risk of double counting, Green-e CPRE has developed explicit reporting procedures for generators participating in GHG registries. In addition, contractual ownership has to be documented.

Registries and fees

Ownership of GHG emission reductions will be documented, in part through the use of electronic tracking systems for RECs. The Green-e Climate Program will update this list as new tracking systems are developed. Generators wishing to participate in this program must have all generation reported to an eligible tracking system.

GHG registries

If the owner of the eligible facility participates in a voluntary or mandatory GHG registry, the renewable energy facility can only participate in this program if the generator owner reports to the registry that the electricity generated at the facility is attributed emissions equivalent to the GHG emission reductions sold in the voluntary market and certified by the Green-e program.

Fees

The fees for certifying facilities according to the Green-e CPRE are paid by the company that is selling Green-e Climate certified offsets from a specific facility. The company has to pay USD 3,000 annually, in addition to the USD 6,000 base certification fee, to certify projects according to the Green-e CPRE.

Selected issues

The Green-e CPRE certifies renewable electricity facilities that are eligible to sell emission reductions as part of the Green-e Climate program. The Green-e CPRE was developed partly in response to the emerging market practice of selling RECs as carbon offsets.[90] Offsets generated from renewable energy facilities face particular challenges in terms of establishing clear ownership and additionality (see the text box on RECs below).

90 Green-e Climate's sister program Green-e Energy certifies RECs.

The Green-e CPRE addresses the issues of ownership and double counting by using Renewable Energy tracking systems, requiring accounting of how the RECs/offsets have been sold and retired, and by having contractual documents that specify that all GHG emission reduction attributes are owned by the seller of the offset.

The Green-e CPRE uses a sector-based performance and technology test to determine additionality. The sector-based approach has the advantage of being transparent and reducing transaction costs for project developers. Yet, any sector-based approach leads, by definition, to the approval of non-additional projects. According to Green-e:

> The data analysis documented that approx. 1% of the new generation capacity added to the US generation sector in 2000–2005 (the last time period for which official data was available) was in response to market drivers (and not legal mandates such as [Renewable Portfolio Standard] RPS policies). In response to this the Green-e Governance Board, with input from stakeholders, judged that the construction of a renewable energy facility in the United States under today's market conditions is an additional activity as long as the other requirements of the Green-e Climate Protocol are met. This is similar to the determination that is presented in the US EPA Climate Leaders Draft Offset protocol for Green Power Purchases,[91] with the exception that the US EPA determines projects post-1997 eligible whereas the Green-e CPRE uses a 2005 threshold.[92]

This approach defines that any new renewable facility which is not under a legal mandate or a Renewable Portfolio Standard is additional. Yet revenue from the sale of offsets from such facilities provides only a small fraction of the total revenue stream. It is therefore questionable whether such a definition of additionality is stringent enough to ensure that no offsets from business-as-usual facilities are sold (see the text box on RECs).

The future of Green-e CPRE

It is unclear what place the Green-e CPRE will have in the future. The protocol states that: "If policies enacted on a state, regional, or federal level impact the GHG emission benefits from renewable energy, this standard will be updated to reflect such changes". It is likely that most or all electricity generating sources in the US will be covered by a compliance program, such as a national cap and trade system. Under such a system, electricity generating facilities would no longer be able to sell offsets in the voluntary market, unless rules were enacted to address how voluntary markets could coexist with mandatory systems in a way that would preserve their environmental integrity and avoid double counting of offsets. Green-e is currently evaluating how renewable energy facilities located in the RGGI region can continue to play a role in the green power and emission reduction markets.

91 It should be noted that the US EPA Climate Leaders module is strictly tied to "indirect" emission claims, and that the determination of additionality is not the same for indirect or direct emission reductions claims, see http://www.epa.gov/stateply/documents/greenpower_guidance.pdf.

92 L. Kvale, personal communication, Center for Resource Solutions, spring 2008.

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Environmental Resources Trust, Inc.,
Pew Center on Global Climate Change,
California Climate Action Registry,
GHG Experts Network
are available at: http://www.green-e.org/

11.5 Green-e Climate Program

http://www.green-e.org/getcert_ghg.shtml

Overview

Type of standard and context

Green-e Climate is a certification program launched in 2008 for carbon offsets sold to consumers in the voluntary offset market. **Green-e Climate** was developed and is administered by the Center for Resource Solutions (CRS),[93] a non-profit organization based in California. CRS was founded in 1997 to identify, promote and implement sustainable development solutions. In addition to Green-e Climate, CRS manages two other certification programs:

- **Green-e Energy** is the leading US independent certification and verification program for RECs. This **Green-e** program is not discussed further in this report.

93 More information about the CRS is available at http://www.resource-solutions.org.

- **Green-e Marketplace** is a program that allows companies to display its logo when they have purchased a qualifying amount of renewable energy and passed verification standards. This program is not discussed further in this report.

In addition, as part of the Green-e Climate program CRS developed the:

- **Green-e Protocol for Renewable Energy**, a part of the Green-e Climate Program, which determines the eligibility of renewable facilities in the United States to sell GHG offsets through Green-e Climate (for details see section 11.4.).

Green-e Climate has a slightly different focus and is complementary to all the other voluntary GHG offset standards described in this report. Green-e Climate is a certification and verification standard for retailers' offset products. It ensures that retailers have actually purchased and retired the types of offsets that they have sold, that there is full disclosure of project information and that no false or misleading claims are made to customers. Green-e Climate endorses other existing GHG offset standards (see 'Recognition of Other Standards' below). Sellers who seek Green-e Climate certification for their sales of offsets must source from projects that are certified by one of the endorsed Programs. Generally, retailers mix together offsets that originate from a variety of projects to create an end product that is sold to consumers. Green-e Climate certifies these products:

> Use of the Green-e Climate logo requires an annual independent audit of the seller's supply and sales to ensure that there is no double selling of reductions sold as offsets; and marketing compliance to ensure customers were told what they were buying in the form of a detailed product content label, which specifies information about their offset, including the project type, which endorsed program certified the project, and the location of the project (Green-e, 2008).

Standard authority and administrative bodies

Green-e Climate was developed and is administered by the CRS. The administrative structures of Green-e Climate are outlined below.

The Green-e Governance Board is an independent body with primary responsibility for oversight and policy setting for all Green-e Programs.[94]

The Green-e Climate Subcommittee is a subcommittee of the Green-e Governance Board with primary responsibility for the independent oversight of Green-e Climate. It reviews stakeholder comments on proposed revisions to the Green-e Climate Program and provides input on such revisions to the Green-e Governance Board.

94 More information and a list of members are available at http://www.green-e.org/about_who_gov_bd.shtml.

The CRS collects comments from stakeholders when it is considering substantive changes to the Green-e Standards. The Stakeholder Committee is open to anyone and has traditionally included representatives from environmental organizations, consumer organizations, power marketers, renewable developers, GHG reduction project developers and marketers, regulators, energy and climate policy experts, and other interested parties.

The Green-e Climate Marketers Advisory Committee (CMAC) is composed of representatives of the program's participant marketers. The CMAC makes suggestions to the Green-e Governance Board on program issues associated with the feasibility and practicality of various implementation options and details, and makes recommendations for changes that improve the effectiveness of Green-e Climate. The CMAC does not have a vote on the Green-e Governance Board.

Regional scope

Green-e Climate has a US focus, but has endorsed several international standards (see below) and is open to certifying products sold anywhere.

Recognition of other standards/ linkage with other trading systems

As of March 2008, Green-e Climate has endorsed four GHG offset standards. The endorsed programs and any specific restrictions are set out below:

Gold Standard

All Gold Standard VERs and CERs are eligible, with the following restrictions regarding hydropower production:

- Outside the US, only hydropower projects with a capacity under 10 MW are eligible.

- In the US only hydropower projects creating emission reductions from new generation capacity on a non-impoundment, or new generation capacity on an existing impoundment, that meet one or more of the following conditions are eligible:

    - the hydropower facility is certified by the Low Impact Hydropower Institute;
    - the facility is a run-of-the-river hydropower facility with a total rated nameplate capacity equal to or less than 5 MW. Multiple turbines will not be counted separately and cannot add up to more than a 5 MW nameplate capacity; and/or
    - the hydropower facility consists of a turbine in a pipeline or a turbine in an irrigation canal.

- In the US and Canada, the Green-e Governance Board will consider on a case-by-case basis GHG emission reductions resulting from new incremental capacity

on an existing dam, where the "new" output is equal to or less than 5 MW. Green-e will not certify GHG emission reductions from new impoundments of water.

Voluntary Carbon Standard (VCS) 2007
All VCUs certified under VCS 2007 are eligible with the following exceptions:

- VCS Agriculture, Forestry and Other Land Use (AFOLU) projects are eligible as long as the seller provides proof that the native species requirements under the Green-e Climate Standard are met.

- Projects that qualify as additional using the VCS "Test 2: Performance Test" are eligible if the applied performance standard explicitly lists the eligible technologies.

- Projects certified according to the previous version of the VCS that are grandfathered in under VCS 2007 are not eligible under Green-e Climate.

- For hydropower, the same rules listed above under the GS apply.

Clean Development Mechanism
CERs are eligible with the following exceptions:

- Due to permanence issues, CDM land use, land-use chance and forestry projects are ineligible.

- No hydropower projects with a capacity over 10 MW are eligible.

Green-e Climate Protocol for Renewable Energy
All offsets certified under the Green-e Protocol for Renewable Energy are eligible (see section 11.4)

Market size and scope

Tradable unit and pricing information

Green-e Climate program tradable units are VERs and CERs. Pricing will vary according to the type of project, the standard used and the quantities purchased.

Standard users

Carbon offset retailers in North America, but in the future offset retailers may be from any region.

Current project portfolio

As of May 2008, five retailers are selling Green-e Certified Products: 3Degrees, the Bonneville Environmental Foundation, Community Energy, Luminant Energy and Renewable Choice.

Offset project eligibility

Project type

Project type eligibility is defined by the endorsed standards, with the restrictions outlined in the above section "Recognition of other standards". Nuclear power, large hydropower and bio-sequestration projects using non-native species are ineligible.

Project locations

Project location restrictions, as defined by the endorsed standards, apply; there are no additional Green-e limitations.

Project size

As defined by the endorsed standards, large hydro power projects are ineligible.

Start date

GHG emission reductions are only eligible if they are from projects that became operational on or after January 1 2000 and if they meet the timing requirements of the endorsed programs. Exceptions might be approved if project additionality can be clearly established for projects with earlier start dates.

Crediting period

The following crediting periods are acceptable for endorsed programs:

- up to 15 years; or,
- 10 years with the option of one renewal; or,
- seven years with the option of two renewals.
- Biological carbon sequestration or conservation projects may permit crediting periods of up to 50 years or the lifetime of the project management plan, whichever is shorter.

Exceptions can be approved if clear justification is provided for crediting period requirements that vary from these guidelines.

Co-benefit Objectives and Requirements

Green-e Climate does not generally require additional co-benefits beyond those which are required by the endorsed standards. One exception is the requirement for bio-sequestration projects to use native species.

Additionality and quantification procedures

Additionality requirements

The endorsed standards must require that all their projects pass a legal, regulatory or institutional test, as well as a timing test (see the Green-e CPRE discussion in section 11.4). In addition, all projects must pass one of the following additionality tests:

- Common Practice Test and Financial Test (both required); or
- Common Practice Test and Barriers Test (both required); or
- Technology Test and Performance Test (both required).

Quantification protocols

Not specified.

Project approval process

Validation and registration

Retailers

To use the Green-e Climate logo, a seller of Green-e Climate certified emission reductions must agree to undergo twice yearly marketing compliance review by CRS and an annual independent verification audit. If a seller is found to be out of compliance, the seller will either have to revise its marketing materials to meet the requirements within 30 days of receiving notice from CRS, or immediately desist using the Green-e Climate logo or making reference to Green-e Climate in any of its marketing materials for this product.

There are two product types eligible for certification under Green-e Climate. A *Fixed Mix Product* has the same combination and proportion of GHG emission reductions from project type(s), locations(s) and endorsed programs(s) (e.g. 45% Gold Standard energy efficiency from India, 55% VCS renewable energy from the US) for all customers. *Customized Mix Products* allow the customer to choose a unique combination and proportion of GHG emission reductions from a specified list of project types(s), locations(s) and endorsed programs(s).

Programs and standards

The Green-e Governance Board evaluates and approves GHG Offset Programs and Standards that seek to be endorsed under the Green-e Climate Standard based on stakeholder feedback. GHG offset programs and standards cannot be endorsed without stakeholders having had the opportunity to comment.

Program requirements and procedures consist of:

- procedural and technical standards for the validation, monitoring and verification of GHG emission reduction projects;
- contractual standards for information disclosure and avoidance of double issuance and double counting of GHG emission reductions; and
- accounting standards that specify consistent methods for estimating baseline emissions, accounting for emission leakage and establishing project additionality.

All projects except small-scale projects require an initial validation.

Monitoring, verification and certification

Retailers

The verification protocol requires sellers offering a Green-e Climate certified product to demonstrate through the use of company contracts, invoices, reports from endorsed standards and billing statements that:

- the seller retired or transferred to customers GHG emission reductions in quantity and type sufficient to meet customer sales for each specific product;
- the GHG emission reductions came from eligible GHG emission reduction projects, certified by an endorsed program;
- the information provided to customers on the product content label is accurate; and
- by attestation, the seller has no knowledge of double counting, double selling or double claiming of the GHG emission reductions used to supply the certified product.

Programs and standards

All projects, except for small-scale projects, require an on-site verification of GHG emission reductions. On-site verification must subsequently occur every five to seven years, at a minimum.

Endorsed programs must either certify the verified GHG emission reductions based on a review and the approval of these verification reports, or require certification of the verified GHG emission reductions from an independent third-party auditor. The auditors have to be accredited either by the International Organization for Standards (ISO) standard 14065; the United Nations Framework Convention on Climate Change (UNFCCC); a national, state or provincial governmental accreditation program; or, with the approval of the Green-e Board, broadly accepted professional accreditation programs.

Registries and fees

All endorsed programs must have tracking systems in place to prevent double counting, double issuance and double selling, and to ensure that GHG emission reductions are not registered more than once.

The annual base fee for Green-e Climate certification is USD 6,000 per year. Carbon retailers also pay a fee based on aggregate metric ton volumes of Green-e Climate sales. Such fees range from USD 9,000 per year for 100,000 metric tons to USD 24,000 and up for upwards of 1M metric tons.

Protocol for Renewable Energy
If the carbon retailer uses the Green-e Climate Protocol for Renewable Energy as an endorsed program, there is a single annual USD 3,000 certification fee in addition to the base and volumetric fees.

Endorsed program fee
The fee for each additional endorsed program certification is USD 2,000 per year. For a seller using one endorsed program for verification (as long as that endorsed program is not the Protocol for Renewable Energy), there is no additional endorsed program fee. For a seller using the Green-e CPRE and an additional endorsed program, the total fee is USD 9,000 in addition to any volumetric fees. For a seller using the VCS and the GS, the fee is USD 8,000 in addition to any volumetric fees.

Selected issues

The Green-e Climate Program is the first program to address retailer accountability for the voluntary market and fills an important niche for quality assurance.

References

Green-e (2008). Climate Standard Version 1.1. Green-e Climate Program. Available at http://www.green-e.org/docs/climate/G-e%20Climate%20Standard%20V1-1.pdf.

Green-e (2008). Green-e Climate Overview, available at http://www.green-e.org/getcert_ghg_intro.shtml.

Renewable Energy Certificates and Carbon Offsets

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 US electric power sales in 2006 (Bird and Lokey, 2007).

In the voluntary carbon offset market, Renewable Energy Credits (RECs) are being converted to and sold as carbon-offset equivalents. Renewable energy projects accounted for 33% of the voluntary carbon market and over half of those originated as RECs (Hamilton *et al.*, 2007). Converted RECs, while historically often cheaper than other offsets, are controversial. To understand why, it is especially important to examine *additionality* and *ownership* issues (Gillenwater, 2007.)

RECs are designed primarily to track renewable energy production. In the United States, for example, many states have established Renewable Portfolio Standards (RPSs). RECs that are used in this type of a quota system do not have to be tested for additionality. In the voluntary markets, RECs do not function under a quota and herefore have to be additional in order to be considered equivalent to offsets, which are meant to compensate for other emissions elsewhere.

If RECs are converted to carbon offsets without any strict additionality testing, these offsets will tend to come from cheaper business-as-usual (BAU) projects, which by definition are economic without additional offset incentives. These BAU projects will tend to dominate the market. Truly additional projects will not be able to compete because they face additional costs or barriers. The sale of non-additional offsets in the voluntary market can potentially hamper truly additional projects and lead to increases in emissions.

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 play a 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 USD 0.05/kWh in some parts of the country (equivalent to perhaps USD 5/tCO_2), and that production tax credits are worth about USD 0.18/kWh in the US, casts some doubt. But the fact that the REC or offset revenue is small compared to the total revenue stream does not inherently make a project non-additional. It does imply, however, that only a small portion of projects will be additional, and that more tests are needed to identify those that were pushed over the threshold by making the project feasible with the extra revenue.

Yet the issue is more complicated than portrayed in the example above, since it is the financing mechanisms (i.e. who shares the project's financial risks) that influence a project's viability. Also, a too stringently applied financial additionality criteria penalizes innovative and entrepreneurial project developers who are willing to take financial risks.

Offsets from renewable energy facilities and RECs 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 emission reductions could potentially be claimed by the wind farm owner, the utility (whose emissions will be reduced due to the new renewable facility, even if it does not own that new facility), the county or state that the wind farm is located in or the end-user of the electricity. 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.

12 OFFSET RETAILERS

Offset retailers sell relatively small quantities of offsets to individuals, businesses, not-for-profits and government agencies. In the past few years the number of retailers in the US, Europe and Australia has grown dramatically. There are now over 200 over-the-counter offset retailers and the number of offsets sold in the voluntary market at least tripled between 2006 and 2007 (Hamilton, 2008).

The sections below profile four carbon offset retailers: the Climate Trust, TerraPass, Native Energy and myclimate. They were chosen either because they have a large market share or because they are innovative in their approach. All four companies are well established and not only purchase offsets for resale but also develop their own projects.

12.1 The Climate Trust

http://www.climatetrust.org/

Overview

The Climate Trust is a non-profit, retail and regulatory offset provider in the US for credits sold on both the voluntary and mandatory offset markets. It was founded in 1997 as an independent qualified organization under the Oregon Carbon Dioxide Standard, the first legislation in the US to regulate greenhouse gases (GHGs) (see section 6.2). It uses funds provided by the owners of new power generating facilities in Oregon to purchase GHG offsets, enabling the power plant owners to offset a portion of their CO_2 emissions as required under the Oregon Standard.

The Climate Trust also offers a range of GHG mitigation services, including GHG offset acquisition and management services, policy assistance and consulting services, to a variety of entities. Its clients include businesses and organizations such as Bon Jovi Tours, Inc., Nike, Seattle City Light, the Public Service Enterprise Group (PSEG) and the Sacramento Municipal Utility District. The mission of the Climate Trust is "to promote climate change solutions by providing high quality greenhouse gas offset projects and advancing sound offset policy" (The Climate Trust, 2008).

The Climate Trust is managed and operated by a Board of Directors, an Advisory Council and employed staff. The Board of Directors includes members nominated by the environmental community, the Oregon Energy Facility Siting Council and the regulated private power generators in Oregon. Power generators that provide offset funding to the Climate Trust may appoint a non-voting member to serve on the Board. The Advisory Council includes members from the private, public and non-profit sectors. There are 11 employed staff members.

Market size and scope

Pricing information

Under its retail offset program, the Climate Trust sold offsets at USD 12 per metric ton of CO_2e, as of September 2008.[95]

Buyers

The Climate Trust primarily purchases and permanently retires GHG offsets on behalf of regulated entities under the Oregon Carbon Dioxide Standard. Through settlement agreements with large emitters in Montana and Massachusetts, it also supplies offsets for these state efforts.[96] The Climate Trust also serves as a voluntary offset retailer for individuals, organizations and businesses choosing to purchase offsets on a voluntary basis.

Current project portfolio

Since its inception, The Climate Trust has directed USD 8.8 million in funding into projects that are expected to offset nearly 2.6MmtCO_{2e} [97] over their lifetime. Offset projects funded by the Climate Trust are located throughout the US. There is also one bio-sequestration project located in Ecuador. The Climate Trust has funded GHG offset projects in each of the following seven categories: energy efficiency, cogeneration, renewable energy, biological sequestration, fuel replacement, material substitution and transportation efficiency. No data are currently available on projected transactions of offsets by the Climate Trust.[98]

Offset project eligibility

Offset standards used

The Climate Trust uses the Clean Development Mechanism (CDM) and the World Resource Institute (WRI) GHG Protocol for Project Accounting as guidance for evaluating the additionality and permanence of GHG offset projects.

Project types

Under the voluntary offset program, any project that results in reduced, avoided or sequestered GHG emissions is eligible for funding.

Project locations

The Climate Trust is open to funding projects located in the US and abroad, but has a preference for projects located in the US and its jurisdictions.

95 More accurately, it retires offset credits on behalf of consumer donations. Updated pricing information is available at http://tinyurl.com/2f76ht.

96 Funding for offset projects in Montana and Massachusetts came from power plant owners as a result of settlement agreements with other environmental organizations (M. Tidwell, personal communication, the Climate Trust, spring 2008).

97 Updated project portfolio information is available at http://www.climatetrust.org/offset_projects.php.

98 A. Kelly, personal communication, the Climate Trust, spring 2008.

Project size
The Climate Trust prefers to fund GHG offset projects that will generate a minimum of 50,000 metric tons of CO_2e over the project lifetime.

Start date
The project start date must come after an Emissions Reduction Purchase Agreement (ERPA) has been signed. There are no further requirements, although the Climate Trust prefers projects that will be implemented within a year of signing an ERPA.

Crediting period
The Climate Trust prefers to purchase GHG offsets that can be generated within 20 years of the project start date. Exceptions are made for biological sequestration projects. Credits are awarded each time the project developer submits a monitoring and verification report. Generally, these are submitted on an annual basis, except in the case of biological sequestration projects where a five-year delivery cycle is used.

Co-benefit objectives and requirements
For each of the Climate Trust's offset projects, information regarding the co-benefits of the project is provided on the Climate Trust website. The Climate Trust has no specific co-benefit requirements but is interested in offset projects that have benefits in addition to GHG reduction benefits. It assesses the co-benefits of a project along with the other project criteria.

Additionality and quantification procedures
Additionality requirements
The Climate Trust uses its own additionality assessment tool to assess the additionality of each project proposal. It uses three common tests: regulatory surplus; a barriers test including financial, technical and institutional barriers; and the common practice test. These tests have been adapted from the CDM additionality tool and the WRI GHG Protocol for Project Accounting.

Quantification protocols
The Climate Trust uses a bottom-up approach for quantifying the baseline of offset projects. In the first phase of project development, applicants use the best available data to develop their own project baseline, which the Climate Trust assesses with the help of outside experts. In later stages, the baseline is finalized following a due diligence procedure and is subsequently included in the project's Monitoring and Verification Plan. In the majority of the Climate Trust's projects, a third-party auditor verifies the baseline.

The Climate Trust addresses permanence with respect to carbon sequestration projects through provisions in the ERPAs (the Climate Trust, 2006). For example, if a carbon sequestration project does not generate the expected carbon offsets, then the project

developer must provide the offsets by purchasing them from another project or refund the Climate Trust.[99]

Leakage concerns are evaluated and addressed by the Climate Trust in accordance with international standards such as the WRI GHG Protocol for Project Accounting and the CDM (the Climate Trust, 2006).

Project approval process

Validation, monitoring and verification

The Climate Trust has invested in many innovative project types that were new to the carbon market. In effect, it self-validated many of the projects in its portfolio. It works with outside experts to ensure that a given project meets the Climate Trust's selection criteria and the criteria laid out in the Oregon CO_2 Standard, and that the offsets generated by the project are quantified in a way that is consistent with international standards. The Climate Trust's selection criteria include additionality, cost effectiveness, the reliability of the proposing entity, the reliability of the project concept, the strength of the monitoring and verification plan, mitigation of financial risk, permanence and ownership.

For each of the Climate Trust's projects, a Monitoring and Verification Plan is developed to monitor the success of the project, calculate and verify the offsets generated by it and ensure the delivery of offsets to the buyer. The plans also include an outline for the Monitoring and Verification Report – the instrument used to report the GHG offsets generated by the project. The Climate Trust requires annual Monitoring and Verification Reports, except in the case of biological sequestration projects where such reports are filed every five years or more.

The Climate Trust is moving toward requiring the project developer to complete a Monitoring Report and a third-party verifier to verify the accuracy of the monitored data and the quantification calculations. The verifier accounts for any discrepancies and submits its findings, including the final verified amount of offsets generated during the monitoring period, in the form of a Verification Report.

Registries

The Climate Trust maintains its own internal registry for offset credits generated through its offset projects.

Selected issues

The Climate Trust has expanded significantly since its inception to serve as an offset provider for individuals and organizations. It also continues to procure offset projects under various state and regional mandatory compliance programs. Plans are underway to develop a new and separate non-profit organization with a national-level focus called the National Climate Trust.

99 A. Kelly, personal communication, the Climate Trust, spring 2008.

The Climate Trust finds that its non-profit model provides several distinct administrative and organizational advantages, including greater independence in decision-making without having revenue drive the organizational agenda, wider access to funding sources including foundation and grant support, and the benefit of expertise from its Board of Directors. The Climate Trust also found that more resources were needed for project solicitation than anticipated and the limits set on allowable funds for this activity in the Oregon legislation have been a challenge.[100]

The Climate Trust has been commended for addressing offset quality and supporting standards, transparency and regulations to foster stability and confidence in the marketplace (Clean Air, Cool Planet, 2006). It is a founding member of the Offset Quality Initiative (OQI), a partnership of six non-profit organizations promoting a policy agenda focused on the effective incorporation of high-quality GHG offsets and other reduction mechanisms into emerging climate change policy in the US (Offset Quality Initiative, 2008). In response to the Federal Trade Commission's request for information regarding carbon offsets and renewable energy certificates, the OQI argued that Renewable Energy Credits (RECs) should not be interchangeable with GHG offsets, which is consistent with the Climate Trust's policy of not selling RECs or pooled emission credits (Offset Quality Initiative, 2008).

Concerns have been raised regarding both the double counting of offsets under voluntary reduction programs and the transparency of information regarding specific offset projects. For example, the Climate Trust buys offsets from the City of Portland for two building energy efficiency programs, despite the city having adopted a strategy to reduce CO_2 emission in 1993. In response to this concern, the Climate Trust states that it allows entities that are part of a voluntary reduction program to claim credit for reductions from a given offset project but not if they are part of a regulatory regime. It argues that early-moving companies should be able to claim some economic and environmental benefit for their actions (Kollmuss and Bowell, 2006).

The Climate Trust has also been criticized for not providing access to specific information in the project validation and verification documents, including how the expected emission reductions from each project are quantified (Clean Air, Cool Planet, 2006). In response, the Climate Trust stated that: "The Climate Trust is currently undergoing an extensive transparency initiative and it is our intention to provide a thorough document on The Climate Trust's overall process as well as documents on specific projects. Given the time required to produce these documents, The Climate Trust will likely release documents over time rather than all at once. We intend to begin providing increased documentation within the next several months".[101]

References

The Climate Trust (2006). *2006 Annual Report*. Available at http://www.climatetrust.org/pdfs/Climate_Trust_Annual_Report_2006.pdf.

100 A. Kelly, personal communication, the Climate Trust, spring 2008.

101 M. Tidwell, personal communication, the Climate Trust, spring 2008.

The Climate Trust (2008). The Climate Trust, available at www.climatetrust.org.

Offset Quality Initiative (2008). Offset Quality Initiative, available at http://www.offsetqualityinitiative.org/

12.2 TerraPass

http://www.terrapass.com

Overview

TerraPass is one of the largest offset retailers in the US. Launched in 2004 as a for-profit company, as of June 2008 it had 160,000 individual offset customers and 20 employees based in San Francisco, California. It sells offsets through the firm's website and through corporate partnerships with the Ford Motor Company, Expedia, Enterprise Rent-A-Car, Sam's Club, HSBC and Yahoo, among others. The TerraPass customer base is largely in North America.

Market size and scope

Pricing information

TerraPass sells VERs in units of 1,000 lbs. of carbon reductions for USD 5.95 (USD 13.11 per metric ton CO_2e).[102]

Buyers

TerraPass customers are primarily individuals and companies in North America.

Current project portfolio

At the end of 2007, TerraPass reported that 478,000 metric tons of CO_2e emission reductions had been generated from its offset project portfolio (TerraPass, n.d.).[103] In 2006, two-thirds of the TerraPass offsets was generated from landfill gas capture and flaring projects, and farm power (animal waste to electricity) projects, while one-third was generated from wind power and landfill power (gas capture and electricity generation) projects. TerraPass is considering including methane reductions from other project types in its project portfolio. Until the spring of 2008, all TerraPass offsets were combined into a single portfolio presented in terms of CO_2e. Now, however, offset buyers can choose the project types they want to support.

102 Pricing information is for June 2008. Updated information in units of lbs of CO_2 is available at http://www.terrapass.com/faq/carbon-offsets.

103 Updated project portfolio information in units of lbs of CO_2 is available at http://www.terrapass.com.

Offset project eligibility

Offset standards used

From 2008, TerraPass is consolidating all its offset projects under the Voluntary Carbon Standard (VCS-2007).[104] Until the end of 2007, TerraPass used Green-e Energy and the Chicago Climate Exchange (CCX) as the standards for their offset projects.

Project locations

Although TerraPass has no limitations on the location of offset projects, all its current projects are located in the US. Furthermore, it does not support renewable energy projects in states such as California and the Regional Greenhouse Gas Initiative (RGGI) states, which have binding emission caps unless suitable set-asides are in place.

Project size

TerraPass has no limits on the size of its offset projects. However, the company reviews co-benefits and associated impacts as part of its "do no harm" policy, which tends to eliminate very large projects from consideration.

Start date

Project start date requirements for offsets purchased by TerraPass vary by the offset type:

CCX credits: after January 1 1999 for most project types.

Green-e Energy offsets: Any eligible renewable facility beginning operation or repowered after January 1 1997. (the Green-e Energy National Standard).

Once all offsets are verified through the VCS, the start date, or more accurately the "financial closure" date, as defined by VCS 2007 is January 1 2002. Under the VCS, this provision will change in late 2008 to two years prior to the project validation date.

Crediting period

TerraPass uses the VCS 2007 crediting period of 10 years. Extending the crediting period of a project will require re-validation and a re-examination of additionality.

Co-benefit objectives and requirements

TerraPass does not require its offset projects to have explicit co-benefits (see the rules for the VCS) but has a general 'do no harm" policy.

Additionality and quantification procedures

Additionality requirements

Prior to 2008, TerraPass applied the Green-e Energy and CCX additionality requirements for their projects. From 2008 onward, TerraPass is applying the VCS (2007) additionality requirements.

104 T. Arnold and A. Stern, personal communications, Terrapass, 2008.

Quantification protocols

TerraPass baseline and monitoring quantification protocols follow the appropriate methodologies developed and approved by the CDM.

Project approval process

Validation, monitoring and verification

All TerraPass projects are validated and verified by third-party auditors according to the rules of the respective offset provider – Green-e, the CCX and, starting in 2008, the VCS.

Registries

Certification through the VCS will require that all offset credits be tracked through the use of a registry. Currently, offset credits from Green-e and the CCX are tracked via their respective program registries. Beginning in 2008, TerraPass expects to use either The Climate Registry or, once available, a registry developed by the VCS.

Selected issues

Until the end of 2007, TerraPass used Green-e Energy and the CCX as the sources of its offset credits. Historically, the CCX was the only entity that could provide small quantities of offsets to start-ups such as TerraPass. TerraPass' growth has now enabled it to contract directly with project developers.

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TerraPass (n.d.). TerraPass project portfolio, http://terrapass.com/projects/verification.html.

Terrapass (n.d.a.). TerraPass, http://terrapass.com.

12.3 NativeEnergy

http://www.nativeenergy.com/

Overview

Program type and context

NativeEnergy is a privately owned for-profit energy company that helps to build Native American-, farmer- and community-owned renewable energy projects. It was founded in 2000 and currently has 19 employees. In August 2005, the Intertribal Council On Utility Policy (COUP)[105] acquired an ownership interest in NativeEnergy on behalf of its member tribes. It remains a significant minority owner. Intertribal COUP is a non-profit council of federally recognized Indian tribes that deals with policy issues related to the telecommunications and energy utility operations and services.

NativeEnergy sells offsets and also offers carbon management, energy efficiency and sustainability consulting services.

NativeEnergy focuses on generating offset credits for the US voluntary offset market from renewable energy projects in the US. It also offers credits from projects in several other countries, including China and Brazil. Native Energy sells offsets and Renewable Energy Credits (RECs) to individuals and businesses. Prospective buyers can calculate their emissions using calculators on the NativeEnergy website and choose to purchase the offsets it provides. They can choose between traditional RECs for green power, offsets from operating new renewable energy projects, referred to as "vintage" offsets,[106] future RECs, or offsets from specific renewable energy projects to help finance their construction referred to as "help build" RECs or offsets. In other words, NativeEnergy's "help build" offsets are *ex-ante* offsets. These are offsets that are sold before the emission reductions have actually occurred. These offsets carry the risk of project failure or underperformance (see more under selected issues).

Market size and scope

Pricing information

NativeEnergy offsets can be purchased on their website for USD 12 per short ton of CO_2[107] (NativeEnergy, n.d.b). Discounted prices are made available for bulk purchases.

Buyers

Individuals, businesses and organizations purchase the voluntary offsets provided by NativeEnergy.

105 More information about Intertribal COUP is available at http://www.intertribalcoup.org.

106 See the discussion under Start Date.

107 Updated pricing information is available at www.nativeenergy.com.

Current project portfolio

In the past, NativeEnergy projects included five wind power projects, five biogas projects capturing methane for electricity generation, one small hydroelectric project and one solar PV project. Of these projects, NativeEnergy has sold all or substantially all of the expected long-term offset credit output. Currently, it is funding two biogas projects and one farmer-owned distributed small-scale wind power project. NativeEnergy is offering vintage offsets from a Brazilian hydroelectric project and a US landfill (accessed on 5/30/08) (NativeEnergy, n.d.c).

Offset project eligibility

Offset standards used

NativeEnergy uses Green-e Energy certification standards for the RECs sold as green power, and offers vintage offsets verified by independent verifiers accredited by VERplus,[108] the VCS and the Gold Standard.

Project types

NativeEnergy funds the development of renewable energy projects including wind, solar and biogas projects.

Project locations

Most projects are located in the US.

Project size

NativeEnergy does not put limits on the size of projects, but it does focus on funding distributed, small-scale energy generation. Projects developed by NativeEnergy are located in the US. Other offsets come from international projects.

Start date

NativeEnergy's vintage offsets are currently from two projects: a CDM project, for which CDM start date rules apply; and a VER project, for which VCS start date rules apply. The help build RECs and offsets are sold on an *ex-ante* basis.

Crediting period

Historically, NativeEnergy has used crediting periods consistent with its initial certification by the Climate Neutral Network, but it is now transitioning to crediting periods permitted by the VCS and/or the Gold Standard.

Co-benefit objectives and requirements

NativeEnergy focuses on the development of new renewable energy projects that help create sustainable economic benefits for Native Americans, Alaska Native Villages, family farmers and rural communities.

108 VERplus is not described in this report. It is another voluntary offset standard frequently used for pre-registration CDM project VERs. More information can be found at www.tuev-sued.de/climatechange.

Additionality and quantification procedures

Additionality requirements

NativeEnergy evaluates the additionality of offset projects based on the following criteria adapted from the United Nations Framework Convention on Climate Change (UNFCCC) and Gold Standard guidelines: the regulatory surplus test, the barriers tests (financial, technological, or institutional) and the common practice test. When appropriate, NativeEnergy also evaluates the additionality of a group of similar projects as a single project for assessment purposes. It does not use performance standards because it does not believe that they are an appropriate test for additionality (NativeEnergy, n.d.d).

Quantification protocols

The methodologies for calculating offsets generated from renewable energy projects were developed for NativeEnergy by the *Climate Neutral Network* for grid-connected wind power projects, Alaska micro-grid wind power projects, and grid-connected biogas projects. Baseline quantification protocols are performance-based and project-specific. All methodology documents are publicly available on NativeEnergy's website.

Project approval process

Validation, monitoring and verification

NativeEnergy's ex-post offsets are validated by accredited CDM validators for the Brazilian hydropower project, and by the Environmental Resources Trust (ERT) for US landfill projects. Currently, there are no validation or registration requirements for NativeEnergy's help-build offset projects, although it is planning to have all of its help build projects, which currently sell *ex-ante* credits, validated by the VCS-accredited auditor once the emission reductions have been achieved. (In other words, the emission reductions will be verified *ex-post*.

At the end of the 2008–2009 fiscal year, NativeEnergy will have its full purchase and sales records reviewed by an independent certified public accountant for the first time and will post the results on its website.[109]

NativeEnergy monitors its portfolio of successfully completed help build projects through a combination of self-reporting and electrical meter data. NativeEnergy reports that it is developing a third-party monitoring process for these projects.

Registries

No information available.

Selected issues

Concerns regarding NativeEnergy's transparency, its sale of *ex-ante* credits and the fungibility of RECs and offsets have been highlighted in reviews of the program. Transparency could be improved by providing documentation regarding its project selection, validation and verification procedures (Clean Air, Cool Planet, 2006).

109 T. Stoddard, personal communication, NativeEnergy, May 30 2008.

With respect to the use of *ex-ante* credits, NativeEnergy provides its customers with information on the level of risk associated with the purchase of such credits and identifies the measures that it will take if the conditions of the purchase are not met. Such measures may include redirecting funds to an alternate project or making up any shortfall by acquiring CO_2 offsets from other sources (NativeEnergy, n.d.e). It is not fully clear if NativeEnergy always bears the risk or if in some cases the buyer bears the risk.

NativeEnergy does provide consumers with clear descriptions of the differences between their traditional RECs, vintage carbon credits and *ex-ante* credits. Nevertheless, there is disagreement over whether RECs should be considered offset credits. NativeEnergy contends that when renewable energy projects meet project-specific additionality criteria, the CO_2 reductions they generate are bona fide carbon offsets.[110]

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12.4 Myclimate

http://www.myclimate.org

Overview

Myclimate – The Climate Protection Partnership (referred to as 'myclimate' in this document) is a non-profit voluntary offset retailer based in Switzerland. Myclimate was established in 2002 and is managed by a Board of Trustees, a patronage committee and 12 employees. It sells offsets through its website and through corporate partnerships with four airlines, various Swiss supermarkets, car companies and over 100 travel agencies in Switzerland and Germany. It also organizes a variety of projects aimed at fostering public dialogue on climate protection, including exhibitions in the Swiss Transport Museum, school projects, platform discussions and other similar

110 T. Stoddard, personal communication, NativeEnergy, May 30 2008.

events. Myclimate, together with eco centre Langenbruck, a non-profit organization in Switzerland, launched a labeling program, Climatop,[111] to identify products with the best carbon footprint within a range of comparable products. A leading Swiss wholesaler, Migros, was the first to use this label for its products.

Myclimate operates internationally through its franchising partners Sustainable Travel International[112] in the US, Österreichisches Ökologie Institut in Austria,[113] Framtiden i våre hender in Norway,[114] and Unisféra and its Program Planetair in Canada.[115] It also plans to form partnerships with franchises in Sweden, Greece, Luxembourg and India.

Market size and scope

Pricing information

Myclimate offsets are Gold Standard Certified Emission Reductions (CERs) and Gold Standard VERs in units of metric tons of CO_2e. As of March 2008, myclimate offsets generated from projects in developing countries were being sold for CHF 38 (USD 36.35) and offsets from a mix of projects in Switzerland and developing countries were being sold for CHF 112 (USD 107.12).[116]

Buyers

Myclimate's clients include large, medium-sized and small enterprises, public authorities, non-profit organizations, event organizers and private individuals.

Current project portfolio

Until 2007, myclimate had achieved close to 100,000 metric tons of CO_2e in emission reductions (23,000 in 2006 and 77,000 in 2007, *myclimate Annual Report*, 2007). Myclimate currently has 22 international projects in Kyoto non-annex I countries at various stages of development: seven are operational, three are in the construction phase and 12 are currently in the planning phase. Due to the high demand for Swiss-based offset projects, myclimate has started to implement domestic projects in Switzerland. Many of its projects are micro-projects. Generally, the size of myclimate projects in developing countries is between 2,000 and 35,000 $mtCO_2e$ per year. Some Swiss projects can be even smaller.

In order to avoid double counting of the offsets generated in Switzerland, an Annex-1 country, myclimate also retires an offset from a project in a developing country for each offset sold from a Swiss project. Thus, buyers pay a premium for Swiss-based projects, since they in fact buy two credits for each offset.

111 See www.climatop.ch for more information.

112 Further information is available at www.my-climate.com.

113 Further information is available at www.myclimate.at.

114 Further information is available at www.mittklima.no.

115 Further information is available at www.planetair.ca.

116 Updated pricing information is available at https://myclimate.myclimate.org.

Myclimate engages in the forward purchasing of offsets.[117] It considers it extremely important to convert the CO_2 reductions it sells into climate protection projects as quickly as possible, but also recognizes that immediate reductions are not always possible or appropriate when priority is being given to guaranteeing the high quality of the projects (myclimate, 2006). It usually retires the agreed amount of CO_2 one to two years after the offset payment. However, at a higher price, it also offers the prompt delivery of existing offsets. Myclimate also bears the risk for under-delivery of credits from offset projects by committing to purchase other offsets if a project fails.

Offset project eligibility

Offset standards used

Myclimate only sells Gold Standard-certified CERs or VERs.

Project types

Myclimate only sells offsets generated by energy efficiency and renewable energy projects. It does not buy emission reductions in the secondary market but instead develops projects itself along with local partners.

Project locations

Eligible offset projects may be located either in Kyoto non-Annex I countries or in Switzerland (see "current portfolio").

Project size

Myclimate has no project size requirements.

Start date

Myclimate adheres to Clean Development Mechanism (CDM) and Gold Standard rules for start dates. Due to additionality concerns, myclimate only sells Gold Standard-certified VERs from pre-registration CDM projects.

Crediting period

CDM and Gold Standard requirements apply.

Co-benefit objectives and requirements

All myclimate projects are required to make a positive contribution to sustainable development, such as improvements to air and water quality, enhancement of the quality of life at the local level, enabling the transfer of technology or knowledge and the creation of employment opportunities. Gold Standard sustainability criteria are used as guidelines for all myclimate projects.

Additionality and quantification procedures

Additionality requirements

CDM and Gold Standard requirements apply.

117 Forward purchasing is different from the sale of *ex-ante* credits (see NativeEnergy). Forwarding purchasing involves the sale of verified *ex-post* credits, which are delivered a few months to a few years after the buyer has paid for them. Delivery usually follows no later than 2 years after the sale.

Quantification protocols
CDM and Gold Standard requirements apply.

Project approval process
Validation, monitoring and verification
Myclimate offset projects are validated and verified by CDM-accredited or Gold Standard-approved third-party auditors.

Registries
Myclimate has operational accounts with the Swiss National Registry for CERs and with the Gold Standard registry for Gold Standard CERs and VERs. myclimate also uses an internal CO_2 registry to manage the whole portfolio. The myclimate CO_2 registry was verified in April 2008 by the auditor Société Générale de Surveillance (SGS), which confirmed that all offset commitments to the end of 2007 had been met and that no double counting had occurred.

Selected issues
Myclimate's activities are transparent. They provide details on each of their offset projects on their websites, including the Project Design Documents. They also provide estimates of expected emission reductions and reports on the status of each project.

Myclimate engages in forward purchasing of offsets. Although forward purchasing does not guarantee additionality, many small-scale additional projects need to secure upfront offset funding to make them viable. It is often easier to implement financially additional projects using funds provided by customers who are willing to pay upfront for the future offsets than if the project were to secure the funding from lenders with the expectation that the debt will be paid off later by customers purchasing carbon reductions. Therefore, forward purchasing can be an incentive for financially additional projects.

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GLOSSARY

Additionality	A criterion often applied to greenhouse gas (GHG) projects, stipulating that project-based GHG reductions should only be quantified if the project activity "would not have happened anyway", that is, that the project activity (or the same technologies or practices it employs) would not have been implemented in its baseline scenario and/or that project activity emissions are lower than baseline emissions (WRI/WBCSD, 2005).
Afforestation	Planting trees on land that historically has not supported forests in order to provide carbon sinks (California Air Resources Board, 2007).
Annex 1 countries	The 36 industrialized countries and economies in transition listed in Annex 1 of the UNFCCC. See also 'Annex B Countries' and 'non-Annex 1 countries.'
Annex B countries	The 39 emissions-capped industrialized 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 end of first commitment period of the Protocol, 2008 to 2012. Annex 1 or Annex B? In practice, Annex 1 of the Convention and Annex B of the 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 the 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 Belorus 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. (www.cdmcapacity.org/glossary.html)
Baseline emissions	An estimate of GHG emissions, removals, or storage associated with a baseline scenario or derived using a performance standard (WRI/WBCSD, 2005).
Baseline scenario	A hypothetical description of what would have most likely occurred in the absence of any considerations about climate change mitigation (WRI/WBCSD, 2005).
Baseline (and monitoring) methodology	A Baseline and Monitoring methodology, as defined in paragraph 48 of the Clean Development Mechanism modalities and procedures, is an approach to an individual project activity, reflecting aspects such as sector and region. No methodology is excluded a priori so that project participants have the opportunity to propose any methodology (UNFCCC, 2007).
Boundary (for GHG assessment)	Encompasses all the primary effects and significant secondary effects associated with the GHG project. Where the GHG project involves more than one project activity, the primary and significant secondary effects from all project activities are included in the GHG assessment boundary (WRI/WBCSD, 2005).
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 GHG [or the net anthropogenic GHG removals by sinks since the start of the project] as verified (adapted from UNFCCC, 2007).
Crediting period	The crediting period for a CDM project activity is the period for which reductions from the baseline are verified and certified by a designated operational entity for the purpose of issuance of Certified Emission Reductions. Project participants shall choose the starting date of a crediting period to be after the date the first emission reductions are generated by the CDM project activity. A crediting period shall not extend beyond the operational lifetime of the project activity (UNFCCC, 2007).
Deforestation	Conversion of land from a forested to a non-forested use (California Air Resources Board, 2007).

Direct GHG emissions.	Emissions or removals from GHG sources or sinks that are owned or controlled by the project developer (WRI/WBCSD, 2005)
Indirect GHG emissions	Emissions or removals that are a consequence of a project activity, but occur at GHG sources or sinks not owned or controlled by the project developer (WRI/WBCSD, 2005).
Leakage	Leakage occurs when activities that reduce GHG emissions (or increase carbon in plants and soils) in one place and time result in increases in emissions (or loss of soil or plant carbon) elsewhere or at a later date. For example, a steel firm in a country covered by the Kyoto Protocol makes reductions by closing one facility and replacing its output with production from a steel plant operating in another country that does not have a GHG constraint. Similarly, a forest can be protected in one location and cause harvesting of forests elsewhere. (California Air Resources Board, 2007).
Legal requirements	Any mandatory laws or regulations that directly or indirectly affect GHG emissions associated with a project activity or its baseline candidates, and that require technical, performance or management actions. Legal requirements may involve: the use of a specific technology (e.g. gas turbines instead of diesel generators); meeting a certain standard of performance (e.g. fuel efficiency standards for vehicles); or managing operations according to a certain set of criteria or practices (e.g. forest management practices) (WRI/WBCSD, 2005).
Monitoring	A monitoring methodology refers to the method used by project participants for the collection and archiving of all relevant data necessary for the implementation of the monitoring plan (UNFCCC, 2007).
Offset	Offsets designate the emission reductions from project-based activities that can be used to meet compliance, or corporate citizenship, objectives vis-à-vis GHG mitigation (Capoor and Ambrosi, 2007)
Operational entity	An independent entity, accredited by the CDM Executive Board, which validates CDM project activities, and verifies and certifies emission reductions generated by such projects (Kollmuss *et al*., 2008).
Permanence	The longevity of a carbon pool and the stability of its carbon stocks within its management and disturbance environment. (WRI/WBCSD, 2005).
Point of regulation	The point of program enforcement at which, specific emitting entities covered under a cap and trade program are required to surrender enough allowances to match their actual emissions within a compliance period (California Air Resources Board, 2007).
Reforestation	Replanting of forests on land that has previously contained forests but that had been converted to another land use (California Air Resources Board, 2007).
Registration	The formal acceptance by an offset program authority of a validated project activity as an offset project activity (Adapted from Kollmuss *et al*., 2008)
(Regulatory) surplus	An emission reduction is in regulatory surplus if it is over and above what is required by law, and not otherwise required of a source by current regulations or other obligations (the Climate Trust, n.d.a).
Start date	For a CDM project, the start date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins (UNFCCC, 2007)
Verification	The act of checking or testing by an independent and certified party to ensure that an emission reduction project actually achieves emission reductions commensurate with the credits it receives (California Air Resources Board, 2007).
Verified or Voluntary Emission Reductions (VERs)	Reductions that are sold exclusively on the voluntary market. VERs are linked neither to the Kyoto Protocol nor to the EU ETS. Sometimes VERs are referred to as Voluntary Emissions Reductions.

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Carbon or greenhouse gas (GHG) offsets have long been promoted as an important element of a comprehensive climate policy approach. Offset programs can reduce the overall cost of achieving a given emission goal by enabling emission reductions to occur where costs are lower. Furthermore, offsets have the potential to deliver sustainability co-benefits, spurred through technology development and transfer, and to develop human and institutional capacity for reducing emissions in sectors and locations not included in a cap and trade or a mandatory government policy. However, offsets can pose a risk to the environmental integrity of climate actions, especially if issues surrounding additionality, permanence, leakage, quantification and verification are not adequately addressed. The challenge for policymakers is clear: to design offset programs and policies that can maximize their potential benefits while minimizing their potential risks. This report is a systematic and comprehensive review of existing offset programs. With this report, we hope to contribute to a constructive policy debate.

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