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State of the Voluntary Carbon Markets 2007:
Picking Up Steam

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Acknowledgments:
This report is compilation of the insights and efforts of a wide range of individuals. In addition to the contributions of each of the organizations sharing information about their operations, this report has required time, attention, and financial support from a dozens of people across several continents. For that reason, we would like to acknowledge the following people who generously gave of their time, energy and resources to make this possible. They include, in no particular order, Steve Zwick, Rebecca Smith, Rachel Mountain, Jena Thompson, Lauren Kimble, Jay Dean, Jessica Lerch, Dan Linsky, Evan Ard, Jason Patrick, Marco Monroy, Jonathan Shopley, Pedro Moura-Costa, Maria Pia Innariello, Philippe Ambrosi, Eron Bloomgarden, Bhavna Prasad, and the staff at Forest Trends and New Carbon Finance. We'd also like to thank Thomas Marcello for his contributions and research.

About New Carbon Finance and The Ecosystem Marketplace

New Carbon Finance is the leading provider of information, analysis and insights into the European and global carbon markets. *New Carbon Finance* was created in May 2006 as a new service of New Energy Finance Ltd. *New Carbon Finance* was founded to create a service that blends the best skills in research, analysis and consulting.

New Carbon Finance constantly strives to provide the most accurate projections of future carbon market prices using proprietary fundamental analysis and models, covering Europe, the global Kyoto and North America markets. The research underlying this report provides a crucial quantitative platform that will substantially enhance the understanding of the fast moving voluntary carbon sector.

New Carbon Finance is a service of *New Energy Finance. New Energy Finance* is a specialist provider of financial information and associated services to the renewable energy and energy technology industry and its investors. The combination of *New Energy Finance* and *New Carbon Finance* brings together a truly global research resource with over 50 full time staff with permanent research bases in the UK, USA, China, India and Australia as well as a wide range of associates and contact networks.

Ecosystem Marketplace is the world's leading source of information on environmental markets and payment schemes for ecosystem services. In particular, we are interested in market-based approaches to the conservation of water-related ecosystem services, carbon sequestration and the myriad benefits of biodiversity. We believe that by providing solid and trustworthy information on prices, regulation, science, and other market- relevant issues, we can help markets for ecosystem services become a fundamental part of our economic and environmental system, helping give value to environmental services that have, for too long, been taken for granted.

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Glossary

AB 32	Assembly Bill 32: California's Global Warming Solutions Act
AEP	American Electric Power
CARB	California Air Resources Board
CER	Certified Emission Reduction
CCAR	California Climate Action Registry
CCBA	Climate, Community, and Biodiversity Alliance
CCB	Climate, Community, and Biodiversity Standards
CCX	Chicago Climate Exchange
CCFE	Chicago Climate Futures Exchange
CFTC	Commodities Futures Trading Commission
CDM	Clean Development Mechanism
CFC	Chlorofluorocarbons
CFI	Carbon Financial Instrument
CO_2	Carbon dioxide
DEFRA	Department for Environment, Food and Rural Affairs (UK)
ECCM	Edinburgh Center for Carbon Management
ECIS	European Carbon Investor Services
ECX	European Climate Exchange
ERT	Environmental Resources Trust
EU ETS	European Union Emission Trading Scheme
ERU	Emission Reduction Unit
GHG	Greenhouse Gas
GWP	Global warming potential
IIED	International Institute for Environment and Development's
JI	Joint Implementation
kWh	kilowatt hour
LULUCF	Land Use, Land Use Change and Forestry
$MtCO_2e$	Millions of tonnes of carbon dioxide equivalent
NGAC	New South Wales Greenhouse Abatement Certificate
NGO	Non- governmental Organization
NO_x	Nitrogen oxide
N_2O	Nitrous oxide
NSW GGAS	New South Wales Greenhouse Gas Abatement Scheme
OTC	Over-the-counter market
PG&E	Pacific Gas & Electric
REC	Renewable energy credit
RGGI	Regional Greenhouse Gas Initiative
SO_2	Sulfur dioxide
tCO_2e	Ton of carbon dioxide equivalent
TREC	Tradable renewable energy credit
VER	Verified Emission Reduction
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Unit
WBCSD	World Business Council for Sustainable Development
WRCAI	Western Regional Climate Action Initiative
WRI	World Resources Institute
WWF	World Wildlife Fund

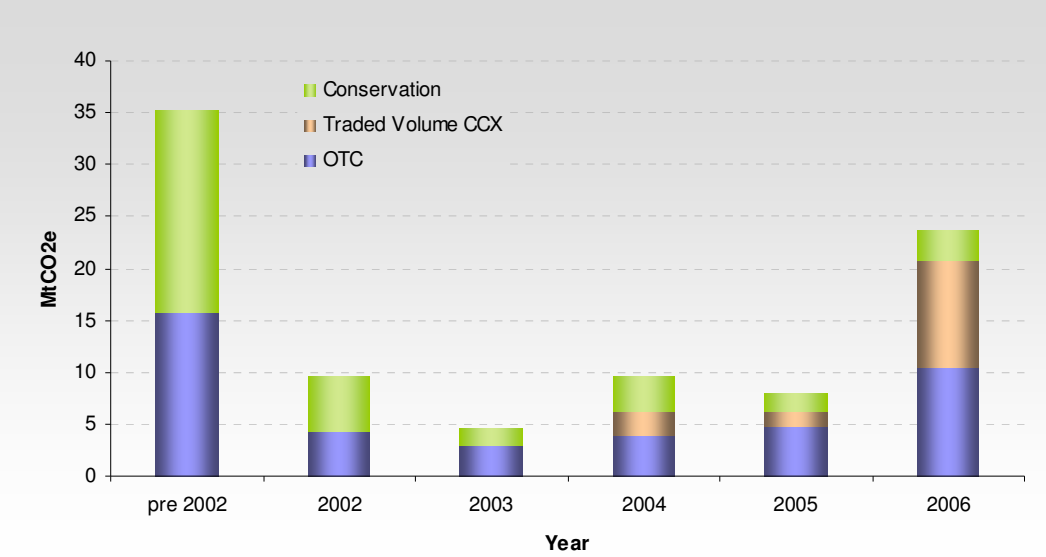
Executive Summary

In the course of 2006 and 2007, interest in climate change, carbon offsets and the voluntary carbon markets accelerated dramatically. And yet despite this interest, and the fact that voluntary carbon markets have effectively been operating since 1989, quantitative data surrounding this market has been sorely lacking. Because of this situation Ecosystem Marketplace and New Carbon Finance teamed up to undertake the most comprehensive analysis to date of the voluntary carbon market. The research has involved a wide ranging survey with responses from over 70 organizations involved all stages of the supply chain from developers, aggregators, developers and retailers, and covering five continents.

The results show that, like the early stages of the regulated carbon markets of the European Union's Emissions Trading Scheme (EU ETS) and the Kyoto Protocol, the voluntary markets are evolving rapidly. They also show that 2006 was a year of significant growth with many new retailers, brokers, and other actors entering the market. Since 2002 the number of organizations supplying carbon credits into the market has grown by 200%, with online retailers being the fastest growing sector of the marketplace.

Between 2005 and 2006 the Over the Counter (OTC) voluntary offset market grew 200%. In 2006 23.7 million tons of carbon dioxide equivalent ($MtCO_2e$) were transacted in the voluntary carbon markets. Of this, 10.3 $MtCO_2e$ were transacted on the Chicago Climate Exchange, and our survey revealed that some 13.4 $MtCO_2e$ were transacted in the OTC market. [1] (See Figure 1). Because it is impossible to capture all OTC transactions in a survey such as this, the actual volume traded may be considerably larger than this amount.

Figure 1: Historically traded volumes in the voluntary carbon market



While these numbers are small relative to volumes of transacted in the regulated carbon markets like the EU ETS, the combined voluntary markets (CCX+OTC) are larger in volume than both the Kyoto Protocol's Joint Implementation mechanism and the New South Wales Greenhouse Gas Abatement Scheme. Just as importantly, the voluntary markets are significant in that they represent an active demand by businesses and individuals for some form of action on climate change in the absence of direct regulation. (See Table 1).

[1] Note that these figures include all transactions between counterparties in the supply chain and is not a reflection of the quantity of voluntary credits retired in 2006.

Table 1: Keeping Up with Kyoto? The Voluntary Markets in Context

	2006 Volume (Million tCO_2)	2006 Value (US$ Million)
Voluntary OTC Offset Market	13.4	54.9
CCX	10.3	36.1
Total Voluntary Market	**23.7**	**91**
Other GHG Trading Schemes		
EU ETS Trading Scheme[2]	1,101	24,357
Primary Clean Development Mechanism	450	4,813
Secondary Clean Development Mechanism	25	444
Joint Implementation	16	141
New South Wales	20	225

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

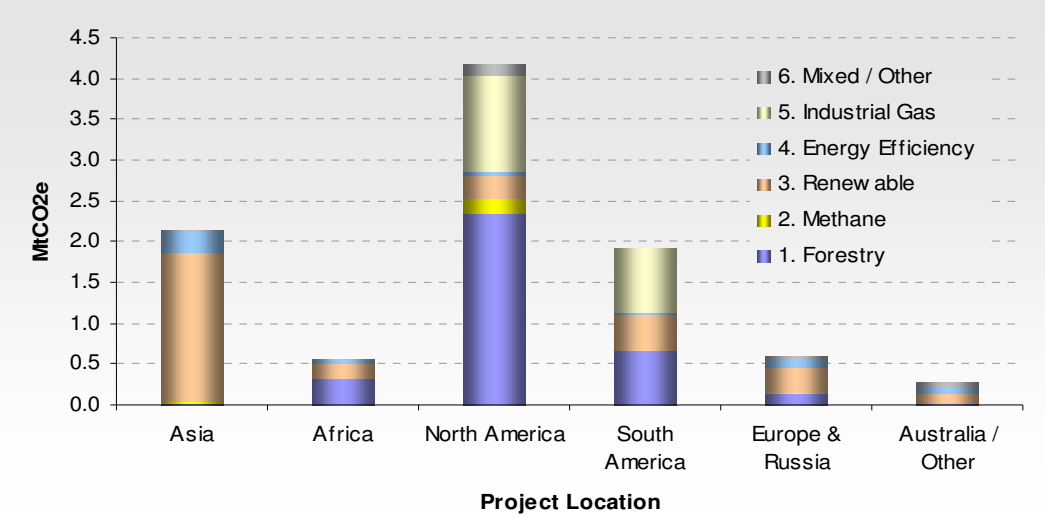
As could have been expected, businesses were the largest buyers (by volume) in this market, but contrary to expectations, anticipation of future regulation did not appear to be the main motivation for purchases. According to buyers surveyed, their main motivations for participation in the market were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

Voluntary carbon markets have historically served as sources of experimentation and innovation in the carbon markets, as well as the markets most likely to reach poorer and smaller communities in developing countries. This is, in part, because they lack the bureaucracy and transaction costs of their regulated counterparts. For example, compared to the Kyoto regulatory markets the voluntary OTC markets are currently the only source of carbon finance for avoided deforestation, have a higher proportion of forestry based credits out of total market transactions than the CDM (36% vs. 1% for CDM), and a slightly higher proportion of credits sourced from Africa (6% vs. 3% for CDM). Moreover, the voluntary markets seem to be a particularly hospitable climate for smaller offset project. More respondents cited selling offset credits sourced from micro projects, generating less that 5,000 tCO_2e, than any other project type. Around 36% of offset credits in the OTC market were sourced from projects less than 100,000 tCO_2e. This provides greater opportunities for voluntary markets to contribute to sustainable development in smaller communities.

In terms of project types our survey found that voluntary carbon markets are not just "charismatic" or "gourmet" carbon. Overall, the OTC market is dominated by three types of projects: forestry sequestration (36%), renewable energy (33%), and industrial gases (30%). (see Figures 2 and 3).

[2] World Bank, State and Trends of the Carbon Markets, 2007

Figure 2. Transactions by project location, 2006 (9.7Mt)



Through the survey we were also able to reveal prices paid for different types of projects.

The volume-weighted average price of carbon on these markets was US$4.1 per tonne of CO2e, although transactions occurred for a vast range of prices; from US$0.45 to US$45 per tonne (See Figure 4). Within this range we see the highest prices being paid for projects with strong quality and verifiability attributes, such as landfill methane and coal mine methane, as well as the more publicly visible forestry projects and long term sustainable development projects, such as energy efficiency and off-grid renewable energy.

Figure 3. Transactions by project type

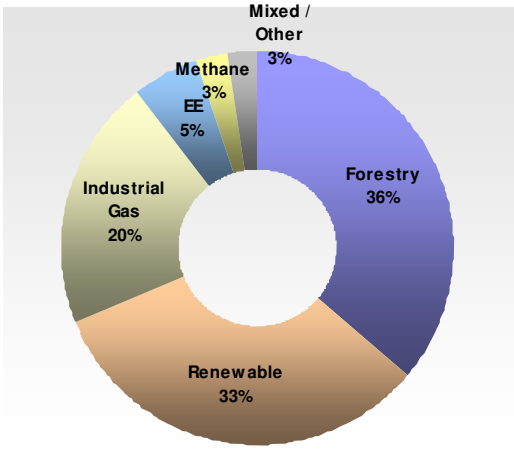
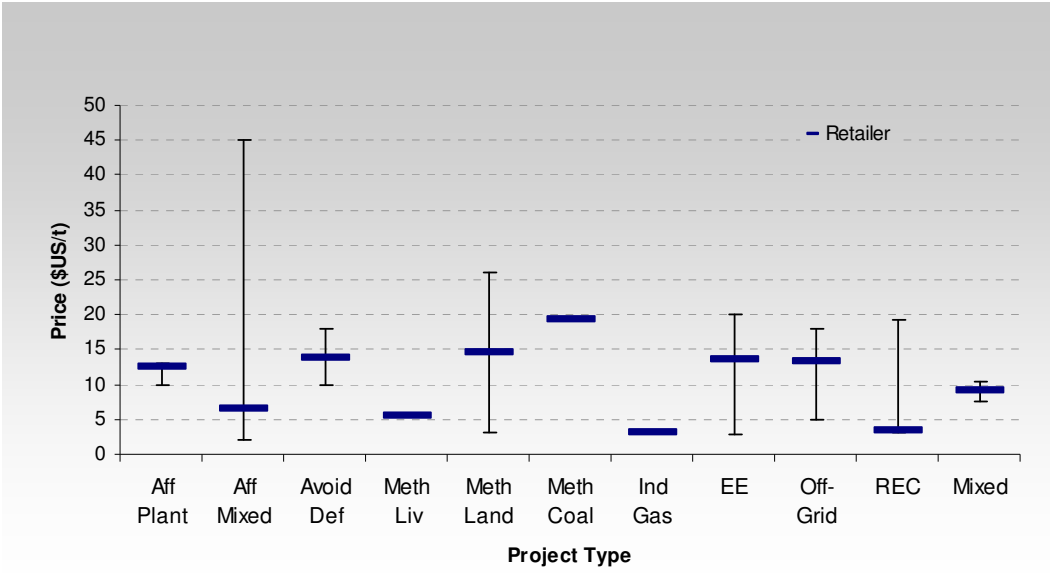


Figure 4. Prices Paid for VERs by Project Type



Based on these figures, we estimate that the voluntary OTC market was worth US$54.9 million in 2006. Together with the CCX market, whose prices ranged from aroundUS$1.50 to almost US$5, we estimate the global voluntary market was worth US$91 million in 2006.

The flexibility of the voluntary markets is both a source of strength and a weakness. One of the reasons the market has very low transaction costs is that it does not require proof of quality in the same way as the regulated markets. For instance, in the OTC markets there are no widely accepted standards, processes for certification and verification, or requirements to list credits on established registries. This lowers transaction costs, but it also makes it a "buyer-beware" market where getting a handle on the quality of credits being bought can be difficult for customers.

But this is changing. The quality of offsets is – and will likely continue to be - the most important issue for both buyers and sellers in this market. In our survey, buyers indicated that the quality of offsets was more important to them than price, and sellers all agreed that addressing issues of quality would ultimately determine how (and how fast) this market continues to grow. According to suppliers, the issues that determine quality of offsets in this market include: additionality (would the reductions have happened anyway with or without the offset purchases), third party certification and verification, standards, and avoidance of double-counting and double-selling (i.e. registries).

As part of the consolidation in the market that began to take shape in 2006, various groups (from non-profits and industry associations, to offset providers and government agencies) continue work aimed at creating rigorous standards and processes as a way of ensuring confidence and quality in the market. In 2006 and early 2007, the issue of quality in the voluntary market became very visible in the form of media stories and articles questioning the validity of offsets being sold. This backlash was (at least partly) the result of the increased growth and visibility of the market, but it also helped to fuel increasing efforts on the part of those interested in the industry to strengthen quality and create standards. These efforts are explained and documented in this report.

Overall, the survey confirmed reports that the voluntary carbon markets are a vibrant and growing sector of the carbon markets, one with direct links to consumers, and one whose future (assuming issues of quality can be addressed) looks bright indeed. In fact, based on data we are beginning to receive, it is possible to predict record volumes for 2007. For example, in June of 2007, the Chicago Climate Exchange reported that in the past six months, it had already traded 11.8 $MtCO_2e$, more than had been traded in the entire year of 2006. If this pattern continues, the CCX is well on its way to trading more than 20 $MtCO_2e$ this year.

As the number of companies and individuals who have decided to go "carbon neutral" seems to grow, the voluntary OTC market is also showing similar signs of growth. Some of the respondents to our survey reported that in 2007 they had seen a doubling, a tripling (or more) of volumes transacted. Already Dell, Delta, AEP, Google, Pacific Gas & Electric, Yahoo, Nike, Sky, Origin Energy, and various other major consumer-facing organizations have announced that they will be buying offsets from the voluntary markets. Since, our plan is to continue to produce yearly analyses of the voluntary carbon market, we look forward to presenting the results of those studies in 2008.

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1. Introduction

The carbon markets have many faces: One face takes the form of well-recognized regulation-driven markets: markets such as the European Union's Emissions Trading Scheme (EU-ETS) or the Kyoto Protocol's Clean Development Mechanism (CDM). These markets are large, well-funded, and followed by dozens of media outlets, hundreds of traders, and countless businesses. This face, despite being only about three years young, regularly makes appearances in the headlines of major financial newspapers around the globe.

Another face – albeit one less well-known – is that of the voluntary carbon markets, which, despite being considerably older than their regulated brethren, has always been the wild, innovative, inventive, and often misunderstood family rebels. One of the first voluntary investments in carbon dioxide sequestration came in 1989, long before the launching of the EU-ETS in 2005, and even before the 1992 signing of the UN Framework Convention on Climate Change, which gave birth to the Kyoto Protocol.

These markets had their start in the desire of conservation organizations to find new ways of financing their projects. Look at the first big deals in this sector, and you will find that they are often deals related to forestry and the conservation of forests. You can see the effects of these deals in the responses to this survey that relate to the voluntary market pre-2002. Since 2003, the voluntary market has gone from being the "only game in town" (from 1989-2003), to being virtually forgotten as the excitement over regulated carbon markets (i.e. the EU-ETS) has taken hold of the public, business, and regulatory imagination.

In 2006, this began to change. In a period where climate change moved from being a subject of much discussion and hand-wringing among certain specialized circles to the subject of gallons of newspaper ink and even the subject of an Oscar-winning documentary, voluntary carbon markets have begun to both pick up steam and step into the spotlight.

Over the past two years, the media attention and corporate interest in the voluntary carbon markets has grown exponentially…at a far more rapid rate than the markets themselves. For the first time, the voluntary carbon markets made headlines: at first overwhelmingly positive, and then increasingly critical. The concept of "carbon neutral" evolved from a little-know concept to the New Oxford American Dictionary's "Word of the Year." At the same time standards, reports, and consulting firms began sprouting up to address concerns about offset quality and the difficulty of navigating this *caveat emptor* marketplace.

However, despite this excitement, the voluntary markets have remained relatively small. After hundreds of conversations and emails, we have been able to document a total of 28.8 million tonnes of carbon transacted in these markets in 2006. These numbers, we should point out, are almost certainly conservative. We know that various groups made sizable transactions that have not been reported through our survey. And yet, while these markets may be relatively small, their value and potential lies elsewhere. It can not be measured merely in tonnes of CO_2e transacted. There is, for instance, a unique indicative component: because buyers engage of their own volition, participation can provide insights into public interest in climate change, as well as where the broader market may be headed. In addition, these voluntary markets can be more nimble, and potentially much more innovative than their regulated cousins.

To give but one example: As was mentioned earlier, some of the first deals in the voluntary carbon market were essentially "avoided deforestation" deals, where compensation is given in order to protect standing forests, thereby keeping carbon emissions out of the atmosphere. Now, decades later, Kyoto markets are spending

considerable time, energy, and money trying to figure out how avoided deforestation might enter the CDM markets.

It is this ability to serve as a harbinger of future change, as well as an empowering agent for innovators, that makes voluntary carbon markets so interesting and unique.

Moreover, if all the indications we have begun to receive are true, and if preliminary data we've gathered for 2007 bears out, the momentum has only just begun. In the past several months, we've heard reports from a variety of sources, such as the Chicago Climate Exchange (CCX), of more trading in voluntary carbon in the first six months of 2007 than in all of 2006. Many of the survey respondents reported experiencing similar (or much greater) growth in 2007. For this reason we're confident that the voluntary carbon markets have already traded far more than 20 million tonnes of CO_2e ($MtCO_2e$) in the first six months of 2007.

And yet, despite this rapid growth and sudden attention, there have been very few quantitative, independent, and publicly available reports on the voluntary marketplace outside of CCX. At the Ecosystem Marketplace, we have been studying this market for years (even writing a book on the markets that was a more "qualitative" analysis of these markets), but we were constantly stymied in our research by the lack of comprehensive and quantitative data on what was happening in these markets. At New Carbon Finance, we faced a similar dilemma: our experts have been studying global carbon markets for over nine years now, but every time we wanted to provide information on the voluntary markets, the data was lacking.

Some reports have contributed to the general understanding of the voluntary carbon markets over the years, but these have been few and far between – and most of them acknowledge that they have only been able to survey variously small portions of the market. And so, rather than bemoan the darkness, we decided to team up, to pool our comparative advantages, and light a candle to shine a small light into these markets.

However, it should be clear that while we've strived to make this report as comprehensive as possible, accessing quantitative information on these markets is not straight forward. For that reason, we call this report a "candle" advisedly; it is not the floodlight we would have liked to shine into these markets. We are very much aware that we have not managed to capture *all* the data that exists and log all of the transactions that took place in this market in 2006. In particular, we have decided to only provide you with the actual numbers reported by survey participants, and not attempt to gross them up. This is because (a) while we acknowledge there may be some operators in the market that did not respond to the survey, we believe we have covered the majority and certainly the main players, and (b) there is no reliable way of extrapolating market wide volumes with a parallel parameter.

And so, despite its shortcomings, we believe this is the most comprehensive and complete study of the market to date. Not only has it been more than two years in the making, but we have contacted more than 125 organizations, have received data from 85 others, and have gone out of our way to sign non-disclosure agreements in an effort to obtain as much proprietary data as possible. Additionally, we plan to produce these reports every year from now on and to build on the insights and contacts established this year. We hope you will contribute to next year's analysis and help us in our attempts to make this "other face" of the carbon markets increasingly viable, more transparent, and thereby better able to address the very real problem of climate change.

We hope you find this data useful and as thought-provoking as it has been for us.

2. The Regulatory Context

As the name suggests, voluntary carbon markets are defined by a lack of regulatory drivers. They do, however, operate alongside their regulated market cousins, and are heavily influenced by them. Hence, understanding the basics of the regulatory markets is key to exploring the voluntary side of carbon trading. Below is a brief outline of these regulated markets.

The Kyoto Protocol

The Kyoto Protocol is a legally-binding agreement under which 169 industrialized countries have agreed to reduce their collective greenhouse gas emissions (GHG) to a level that is 5.4% below their 1990 emission levels by 2012. It came into effect in 2005, and had been ratified by 169 countries as of late 2006. It is under the Kyoto regime that the world's largest GHG market has evolved.[3]

This market is based on a cap-and-trade model with three major "flexibility mechanisms": Emissions Trading, Joint Implementation and the Clean Development Mechanism. These mechanisms are the foundation of the regulated international Kyoto carbon market:

Emissions Trading is an allowance-based transaction system that enables developed countries and countries with economies in transition to purchase carbon credits from other developed countries and economies in transition to fulfill their emissions reductions commitments. The mechanism has resulted in the European Union Emission Trading Scheme (EU ETS), which involves all EU member states and is the currently the world's largest multi-national GHG emissions trading scheme. Credits traded under the system are called European Union Allowance (EUAs). In 2006, the EU ETS market traded 1,101 $MtCO_2e$, and the market was valued at $US 24,357 million.[4]

Joint Implementation (JI) allows emitters in developed countries (referred to as Annex 1 countries under the Kyoto Protocol) to purchase carbon credits via "project-based" transactions (meaning from greenhouse gas reduction projects) implemented in either another developed country or in a country with an economy in transition. Emissions from these JI projects are referred to as Emission Reduction Units (ERUs). In 2006, 16.3 $mtCO_2e$ of ERU credits were transacted at an average price of US$8.70.[5]

The Clean Development Mechanism (CDM), like JI, is a project-based transaction system through which industrialized countries can accrue carbon credits. Unlike JI, however, CDM credits are acquired by financing carbon reduction projects in developing countries. Carbon offsets originating from registered and approved CDM projects are called Certified Emissions Reductions (CERs). This mechanism is the critical link between developed and developing countries under Kyoto and is the flexible mechanism participants in the voluntary market most often seek to emulate. Accepted CDM projects have become a major influence on 'setting the bar' for offset projects in developing countries. CERs and ERUs can also be sold on the voluntary markets. In 2006, the CDM transacted credits valued at around US$5 billion and representing reductions of 450 $MtCO_2e$. Some of these credits were further sold into a burgeoning secondary market which traded 25 $MtCO_2e$ of secondary CDM credits, valued at US$ 444 million.[6] The average CER price in 2006 was US$10.90.[7]

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[3] Six GHG are listed under the Kyoto: carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydro fluorocarbons and perfluorocarbons.

[4] The World Bank. *State and Trends of the Carbon Market, 2007*. http://carbonfinance.org/docs/Carbon_Trends_2007-_FINAL_-_May_2.pdf>.

[5] Ibid.

[6] Primary CER transactions are those sold directly from projects. Secondary transactions are where primary CERs are sold to a second buyer.

[7] World Bank. *State and Trends of the Carbon Market 2007*.

The UK Emissions Trading Scheme

Three years before the EU launched its trading scheme, the UK government launched the UK ETS in March 2002. This was a voluntary scheme and the world's first cap-and-trade GHG emissions trading scheme. The system ended in December, 2006, and final market reconciliation occurred in March 2007, five years after its launch. Over the lifetime of the scheme, thirty-three "direct participant" organizations achieved emissions reductions of over 7.2 $MtCO_2e$.[8] In 2006, about 11.9$MtCO_2e$ were traded.[9]

The United States

The United States did not ratify Kyoto, and the federal government does not currently regulate carbon dioxide (CO_2) or other Kyoto GHGs as climate change-related pollutants. Having ratified the Montreal Protocol, the US does regulate ozone depleting GHGs, such as Chlorofluorocarbons (CFCs), which are internationally being phased out entirely.

To compensate for the lack of national CO_2 regulation, several states have initiated their own regulatory processes, alone or in conjunction with others. Legislation is quickly evolving at the national and multi-state level as more states step up to the plate on climate legislation and members of Congress announce new legislative proposals on a monthly basis. As of May, 2007, legislators in the 110th US Congress introduced more than 70 bills, resolutions, and amendments addressing climate change.[10] Currently, GHG emissions markets exist or may soon exist under the following regimes:

- In 1997, Oregon enacted the **Oregon Standard**, the first regulation of CO_2 in the United States. The Oregon Standard requires that new power plants built in Oregon reduce their CO_2 emissions to a level 17% below those of the most efficient combined cycle plant, either through direct reduction or offsets. Plants may propose specific offset projects or pay mitigation funds to The Climate Trust, a non-profit created by law to implement projects that avoid, sequester or displace CO_2 emissions.[11]

- On the East Coast, ten states are developing the **Regional Greenhouse Gas Initiative (RGGI)**, a regional strategy to reduce CO_2 emissions utilizing a cap and trade system. This is set to be launched in January, 2009, and will initially focus on power plants that use fossil fuels to generate over half their electricity and have energy production capacity above 25 MW. The program may be extended to include other GHGs and offsets from projects and project-based transactions.[12] The scheme has a sliding scale that permits the use of flexible mechanism credits based on market prices: the lower the price of emission reduction credits, the more restrictive the use of those credits. If the average price of credits across the United States remains under $US 7, then the scheme only allows participants to cover up to 3.3% of their emissions – or about half their mandated reduction – using credits from emission reduction projects, which must be located within the United States. If that price goes above $US 7, then offsets can be used for up to 5% of emissions, and if prices rise above $US 10 per ton, participants can use offsets for 10% of their emissions – and those offsets can come from the US as well as from the EU ETS and the Kyoto Protocol's CDM.[13]

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[8] DEFRA (Department for Environment, Food and Rural Affairs). 2007. *UK Emissions Trading Scheme*. <http://www.defra.gov.uk/environment/climatechange/trading/uk/index.htm> Updated May 23.

[9] World Bank. *State and Trends of the Carbon Market, 2007*.

[10] Pew Center on Climate Change. Legislation in the 110th Congress Related to Global Climate Change <http://www.pewclimate.org/what_s_being_done/in_the_congress/110thcongress.cfm>.

[11] The Climate Trust. 2005. About Us. <http://www.climatetrust.org/about_us.php>. (accessed April 26, 2006).

[12] RGGI (Regional Greenhouse Gas Initiative). About RGGI. <http://www.rggi.org/about.htm>. (accessed April 6, 2006).

[13] Pew Center on Climate Change. Q & A: Regional Greenhouse Gas Initiative. <http://www.pewclimate.org/what_s_being_done/in_the_states/rggi/rggi.cfm>.

- California's **Global Warming Solutions Act (AB 32)** is the first US state-wide program to cap all GHG emissions from major industries that includes penalties for non-compliance. Under the Act, the California's State Air Resources Board (CARB) is required to create, monitor and enforce a GHG emissions reporting and reductions program. CARB is authorized to establish market-based compliance mechanisms to achieve reduction goals. There is a strong possibility this will include other US States.

- For example, California has also joined five other states (New Mexico, Oregon, Washington, Arizona, Utah) and two Canadian provinces (British Columbia, Manitoba) in the **Western Regional Climate Action Initiative (WRCAI),** which formed in February, 2007, and is expected to announce an overall regional reduction goal by August 2007, followed by a market-based reduction mechanism within one year.

- In mid- 2007, thirty-one US states signed onto **The Climate Registry**. Like the California Climate Action Registry, this Multi-State-and-Tribe Registry was created to "provide an accurate, complete, consistent, transparent and verified set of greenhouse gas emissions data from reporting entities, supported by a robust accounting and verification infrastructure." This registry was developed to facilitate regulatory or voluntary reporting. While the Registry is not currently being utilized by a cap-and-trade system, it will likely become part of such an initiative. Moreover, the popularity of this initiative signals that such registries will likely continue to play a key role in the United States, not only in potential regulatory markets but also on the voluntary front. States which have signed on to the Registry have agreed to a series of goals including, "to establish and endorse a voluntary entity-wide greenhouse gas emissions reporting and verification system."[14]

The New South Wales Greenhouse Gas Abatement Scheme

The New South Wales (NSW) Greenhouse Gas Abatement Scheme (GGAS) is an Australian mandatory state-level program designed to "reduce greenhouse gas emissions associated with the production and use of electricity; and to develop and encourage activities to offset the production of greenhouse gas emissions."[15] GGAS was launched in 2003 – two years before the EU ETS. The scheme establishes annual statewide greenhouse gas reduction targets of 7.27 tonnes per capita), and then requires individual electricity retailers and certain other parties who buy or sell electricity in NSW to meet mandatory benchmarks based on the size of their share of the electricity market. [16]

If a regulated emitter exceeds its target, it has the choice of either paying penalty of AU $11.50 (about US$ 9) per ton, or purchasing offset emissions in the form of New South Wales Greenhouse Abatement Certificates (NGACs), which are generated by emissions abatement projects carried out within the state. NGACs can be generated by approved abatement certificate providers with projects that lead to: low- emissions electricity generation, energy efficiency, biological CO_2 sequestration, or that reduce on-site emissions not directly related to electricity consumption.[17] A Greenhouse Registry "records the registration and transfer of certificates created from abatement projects."[18] The initiative does not accept credits, such as CERs or ERUs, from outside of the state. The NSW GGAS is the world's second-largest regulated cap-and-trade GHG market, with about 20.2 $MtCO_2e$ traded in 2006 and an estimated value of US$225.4 million.[19]

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[14] The Climate Registry. Principles & Goals. <http://www.theclimateregistry.org/principlesgoals.html>.

[15] NSW GGAS (New South Wales Greenhouse Gas Abatement Scheme). *Scheme Introduction*. <http://www.greenhousegas.nsw.gov.au/overview/scheme_overview/overview.asp>.

[16] NSW GGAS (New South Wales Greenhouse Gas Abatement Scheme). *Greenhouse Gas Abatement Scheme*. <http://www.greenhousegas.nsw.gov.au/>.

[17] NSW GGAS (New South Wales Greenhouse Gas Abatement Scheme). *Abatement Certificate Activities*. <http://www.greenhousegas.nsw.gov.au/acp/generation.asp>.

[18] NSW GGAS (New South Wales Greenhouse Gas Abatement Scheme). *Greenhouse Gas Abatement Scheme*. <http://www.greenhousegas.nsw.gov.au/>.

[19] World Bank. *State and Trends of Carbon Market, 2007.*

3. Introduction to the Voluntary Carbon Markets

The voluntary carbon markets include all carbon offset trades that are not required by regulation. Voluntary market transactions include: the purchase of carbon credits by individuals or institutions at a retail level to offset their emissions; the purchase of credits directly from project developers for retirement or resale; and the donation to GHG reduction projects by corporations in exchange for credits. At the broadest level, the voluntary carbon markets can be divided into two main segments: the voluntary, but legally binding, cap-and-trade system that is the Chicago Climate Exchange (CCX); and the broader, non-binding, over the counter (OTC) offset market.

The Chicago Climate Exchange (CCX)

CCX defines itself as "the world's first and North America's only voluntary, legally-binding, rules-based greenhouse gas emission reduction and trading system." [20] CCX is driven by a membership-based cap and trade system. Members voluntarily join CCX and sign up to its legally-binding reductions policy. Like the Kyoto markets, CCX trades 6 different types of GHGs converted into a common unit of tCO_2e. The CCX's unit of trade is the Carbon Financial Instrument (CFI), which represents 100 tCO_2e. CCX CFIs can be either *allowance-based credits*, issued by emitting members in accordance with their emission baseline and the exchange's reduction goals, or *offset credits* generated from qualifying emission reduction projects.

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

- **Full Members** are "entities with significant direct greenhouse gas (GHG) emissions and whose commitments are audited by NASD." Members who joined in Phase I committed themselves to each reducing GHG emissions 1% a year from a baseline determined by their average emissions from 1998 through 2001. The current goal (Phase II) is for members to reduce their total emissions to 6% below the baseline by 2010. Hence, members who have been participating for the past four years only need to reduce an additional 2%, while new members need to reduce 6% during this time. [21]

- **Associate Members** are "entities with negligible direct GHG emissions, such as office-based institutions, businesses and service organizations. Associate Members commit to report and fully offset 100% of indirect emissions associated with energy purchases and business travel from year of entry through 2010 and are audited by NASD."

- **Participant Members** are project developers, offset Aggregators and liquidity providers, which trade on the Exchange for purposes other than complying with the CCX emissions reduction schedule.

In 2006, about 10.3 $MtCO_2e$ were transacted on CCX. As of July 2007, a total of 26.3 $MtCO_2e$ had been traded on the exchange.[22]

While all CCX credits are transacted voluntarily, the exchange does have links to the regulated markets and even accepts EUAs. In 2006, at least 1,000 EUAs were transferred into the CCX by a multi-national member (only one transaction was publicly disclosed). However, at the end of 2006, as EUA prices for 2007 contracts plummeted, this link between markets was suspended.

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[20] CCX (Chicago Climate Exchange). <http://www.chicagoclimatex.com/>.
[21] Ibid.
[22] CCX. 2007. Chicago Climate Exchange Market Report, vol. iv. #5. May 2007. <http://www.chicagoclimatex.com/docs/publications/CCX_carbonmkt_V4_i5_may2007.pdf>.

In 2005, the CCX also launched the European Climate Exchange (ECX), which has since become the major exchange for EU ETS allowances. CCX's parent company, Climate Exchange Plc, also launched the Chicago Climate Futures Exchange (CCFE), a CFTC-regulated futures exchange for US SO_2 allowances and US NOx Ozone Season allowances. In early 2006, in anticipation of the US Northeastern state's RGGI, CCX announced the development of the New York Climate Exchange and the Northeast Climate Exchange. It has since also created the Montreal Climate Exchange as well as announced that it intends to create a California Climate Exchange.

The Voluntary Offset Market

Outside of CCX one finds a wide range of voluntary transactions that make up an overall voluntary market that is not driven by an emissions cap. Because this market is not part of a cap-and-trade system, where emission allowances can be traded, almost all carbon offsets purchased in this voluntary market originate from project-based transactions. Hence, this market can be referred to as the voluntary offsets market.[23] Because it does not operate via a formal exchange, it can also be referred to as the voluntary Over The Counter (OTC) market. While credits from CCX are referred to as CFIs, credits in this market are often generically referred to as Verified (or Voluntary, depending on the source) Emissions Reductions (VERs), or simply as carbon offsets.[24] Throughout this report, the terms will be used interchangeably.

Because voluntary offset market demand is not driven by a cap, especially in the retail market, the demand curve for offset purchases has as much in common with the markets for Fair Trade or organic cotton as it does with the EU ETS. Buyer motivations include wanting to manage their climate change impacts, an interest in innovative philanthropy, public relations benefits, the need to prepare for (or deter) federal regulations, and plans to re-sell credits at a profit. (See Section 8 for a more complete analysis of buyer motivations.)

Suppliers in the offset market include retailers selling offsets online, conservation organizations hoping to harness the power of carbon finance, developers of potential JI or CDM projects with credits that – for a range of reasons – cannot currently be sold into the regulated market, project developers primarily interested in generating VERs, and aggregators of credits. Depending on their position in the supply chain, sellers can be categorized at four major levels.

- **Project developers** develop greenhouse gas offset projects and may sell carbon to aggregators, retailers, or final customers.
- **Aggregators/Wholesalers** only sell offsets in bulk (defined as more than 25 tco_2e for the purpose of this report) and have ownership of a portfolio of credits.
- **Retailers** sell small amounts of credits to individuals or organizations, usually online, and have ownership of a portfolio of credits.
- In some cases VERs also pass through **brokers**, who do not own credits, but facilitate transactions between sellers and buyers.

However, like much of the voluntary OTC markets, these definitions are often blurred and frequently organizations operate in more than one category level. The growing number of "**carbon funds**" also defy categorization.[25] In addition, many suppliers are engaged in business activities other than selling VERs. For example, most major brokerage firms dealing in VERs also transact in the regulated market or in other emissions markets.

In reality, there is also a range of value chain patterns. At the most simple level, a final buyer purchases credits and retires credits from a project developer. At the most complex level, an offset credit will pass in a brokered deal between a project developer and an

[23] It is important to note that offsets do exist under CCX.

[24] The term VER is also used specifically to refer credits generated by aspiring CDM projects that have not yet been registered by the CDM Board. Once registered these credits will generate CERs.

[25] Zwick, Steve. "Carbon Funds: In the Drivers Seat." Ecosystem Marketplace. 25 June 2007.

aggregator, and then be sold to a retailer, who sells to the final buyer. There has been little research done in the voluntary markets into how transaction costs/values are added at different levels of the supply chain, which also may include certification programs, verifiers, or registries. In and before 2006, it is likely that most credits were directly purchased from project developers or were retired and sold by retailers who purchased from project developers.

Government Voluntary Purchasing Programs

In several cases, governments have instituted voluntary emission reduction and carbon offset purchasing programs. When deciding whether to include these programs in this analysis of the voluntary carbon markets, these programs were screened by whether they contributed to a country's regulatory requirements or Kyoto commitments. For example:

- Japan's **Keidanren Voluntary Action Plan on the Environment**: Japan's Kyoto commitment is to reduce GHG emissions to 6% below those of the 1990 level in the first commitment period from 2008 to 2012. One aspect of the country's reduction strategy is the Keidanren Voluntary Action Plan, which encompasses 58 different Japanese business associations.[26] Member companies have committed to collectively reduce their total emissions to 1990 levels by 2010. To achieve this goal, companies are both reducing their own emissions and purchasing Kyoto CDM or JI credits. While these credits are, in theory, purchased voluntarily, the only viable offsets are from Kyoto mechanisms. Furthermore, purchases are accounted for in a national registry system and are used to meet Kyoto commitments. Hence, we have not included Keidanren purchases in our quantitative analysis of the voluntary carbon markets.

- The Australian government's **Greenhouse Challenge Plus** program was created to help Australian companies improve energy efficiency and reduce GHG emissions. Like the United States' Environmental Protection Agency's Climate Leaders program, this program includes emission reduction progress reporting and technical assistance. However, a particularly unique aspect of the program is the Greenhouse Friendly Initiative, which certifies credits from emission abatement programs as well as 'carbon neutral' claims. Although this initiative is part of a government program, we have chosen to include it in our analysis of the voluntary carbon markets because Australia has not joined the Kyoto Protocol and greenhouse emissions are not regulated at a national level. Furthermore, the program allows entities to utilize credits that are not part of a regulatory system. We have included as much information as possible from this program in our analysis of the voluntary carbon markets.

[26] Morgenstern, Richard D. and Pizer, William A. *How Well Do Voluntary Environmental Programs Really Work?* Resources for the Future. Winter 2007. http://www.rff.org/Documents/RFF-Resources-164_VoluntaryPrograms.pdf>.

4. Size and Growth of the Voluntary Carbon Markets

Methodology

For this market-wide study, our goal was to survey as many VER suppliers as possible. Our data-collecting process included surveying suppliers in the voluntary carbon markets between April 17th and June 8th 2007, as well as utilizing information from the publicly-available Environmental Resources Trust (ERT) registry, and the CCX. The first step was to compile a "master" list of known offset suppliers around the world, and send the survey to these entities. The list included conservation organizations, other project developers, brokers, online retailers, aggregators etc. We also circulated an announcement about this project and a link to the survey on the Ecosystem Marketplace's V-Carbon news, the International Institute for Environment and Development's (IIED) Climate-L list serve, the Katoomba Group newsletter. The Australian government's Greenhouse Friendly program and the Climate Group also circulated information about the survey to their members.

After this process, we received survey information from 68 different organizations that sold or facilitated the transaction of voluntary offsets in or before 2006. We also collected information from three different certification programs. For a list of non-anonymous respondents that classified themselves as "offset sellers", see Appendix 1. It is difficult to determine response rate from the surveys because the use of list-serves and the learning process of understanding how and if various organizations supplied credits to the voluntary carbon markets. Since respondents had the option of skipping questions, the response rate also varied by question.

There was, however, one targeted group of 88 confirmed VER retailers and wholesalers who received the survey, and 77% of them responded. Still, we recognized it is highly likely we did not capture this percentage of the total market. Compared to project developers, retailers and wholesalers are more visible and easy to track in the marketplace. Most retailers sell their offsets and advertise online. Hence, we believe we have most effectively tracked this dimension of the market. While we have responses from a large number of project developers, we found it most difficult to track and contact project developers outside of the US, EU or Australia. Hence, this segment of the market may be under-represented in this report. Moreover, we were unable to access information from several relevant carbon funds. As this is an annual report, ideally it will become increasingly simple to track and gain information from a wide range of suppliers.

Undoubtedly, we were not able to account for every VER supplier, much less every VER transaction. In addition to confidentiality concerns and time constraints, lack of response may have been due to the fact that the survey was only sent in English – although it should be noted that we did not receive any requests for translation and did receive responses from non-English speaking countries. It is also possible that people bought forward contracts for credits that, for reasons of confidentiality, we are not able to track

As illustrated by Figure 1, about half of the respondents were from the United States. After the US, the country with the second most respondents was the UK, followed by the rest of Europe and Australia. This response rate definitely reflects the surge of interest in the voluntary market in North America, in the absence of any regulated regime (and possibly anticipating just such a regime). The relatively high number of UK respondents may coincide with the prevalent growth of eco-awareness in the UK. However, response rate may have also been influenced by the fact that the Ecosystem Marketplace and New Carbon Finance are US- and UK-based.

Almost all of the respondents who were retailers or aggregators were based in the US, EU, or Australia, which is most likely a fairly accurate portrayal of the marketplace. However, there are far more project developers selling VERs across the globe than we were able to survey. Because international project developers were more difficult to track,

we believe the lowest response rates relative to actual market activity are in Asia and Latin America.

Figure 1: Respondents by location

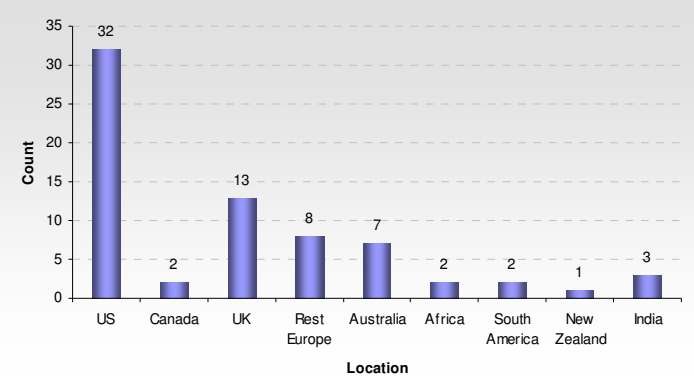
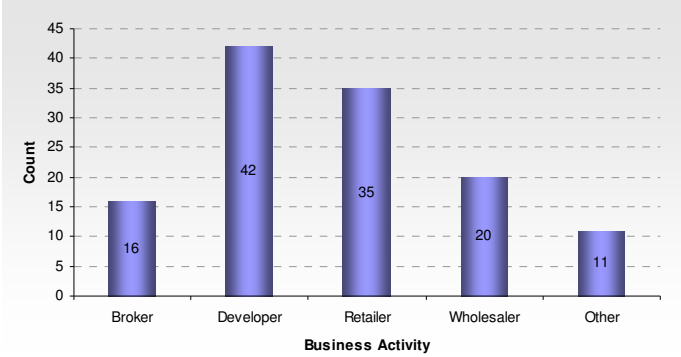


Figure 2: Respondents by indicated business activity



Each respondent was asked to identify their position in the supply chain. In cases where organizations fit into more than one category, to simplify this analysis, they were assigned a primary activity based on the organization's response and research into the organization's activities.

Due to the huge number and variety of buyers in the voluntary carbon markets, it was more efficient to access and analyze transaction data at the supplier level. However, to gain further insights into buyer motivations and screen for missing transactions, we also sought to survey offset buyers. We received 15 responses from institutional buyers who were final buyers of retired offsets. This information was primarily used to check for missed suppliers and to further understand final buyer demand in the market.

When analyzing data, we did not apply a quality criteria screen and included all claimed carbon credit sales in the voluntary markets. We did strive to avoid "double counting" by screening for sales, which were accounted for in both our survey process and the CCX or ERT registries. For example, one very large transaction was reported both through our survey and on the CCX. Following conversations with the parties involved the appropriate proportion was accounted for on the CCX and in the OTC market.

Measuring Momentum

According to data from the survey, the ERT registry, and the Chicago Climate Exchange, we found that a total volume of **23.7MtCO$_2$e** was transacted in the voluntary carbon markets in 2006. A little less than half of this volume (10.3MtCO$_2$e) was exchanged on the CCX.[27] A confirmed 13.4 MtCO$_2$e were transacted by the OTC voluntary offset markets.

Using a volume-weighted average price of carbon in these markets of US$4.1 per tonne of CO2e, we estimate that the voluntary OTC market was worth US$54.9 million in 2006. Together with the CCX market, whose prices ranged from aroundUS$1.50 to almost US$5, we estimate the global voluntary market was worth **US$91 million** in 2006.

It is important to note that this estimate is conservative. This is due to several factors, including the number of suppliers we were unable to contact, the number of potential suppliers active in the market that did not respond to the survey, and the fact that 20% of survey respondents did not disclose volume data. This market size estimate should therefore be seen as conservative.

Note that number accounts only for confirmed credits sold. While registered corporate or project-based emission reductions are significantly higher than credits actually sold (e.g.,

[27] CCX (Chicago Climate Exchange). <http://www.chicagoclimatex.com/>.

ERT's Greenhouse Registry accounted for 653,000 tonnes of carbon registered in 2006) it is not appropriate to add these to the volume of the known transacted volume in 2006 because it is not clear if they have been or will be transacted.

Compared to the regulated markets, the CCX and OTC markets together traded an amount equal to roughly two percent of the volume of the EU ETS market, or about what the EU ETS currently transacts in a week. However, the combined transaction volume of the OTC and CCX markets was higher than both JI and the New South Wales Greenhouse Gas Abatement Scheme, and nearly the same as the secondary markets for CDM credits.

Table 2: Keeping Up with Kyoto? The Voluntary Markets in Context

	2006 Volume (Million tCO_2)	2006 Value (US$ Million)
Voluntary OTC Offset Market	13.4	54.9
CCX	10.3	36.1
Total Voluntary Market	**23.7**	**91**
Other GHG Trading Schemes		
EU ETS Trading Scheme[28]	1,101	24,357
Primary Clean Development Mechanism	450	4,813
Secondary Clean Development Mechanism	25	444
Joint Implementation	16	141
New South Wales	20	225

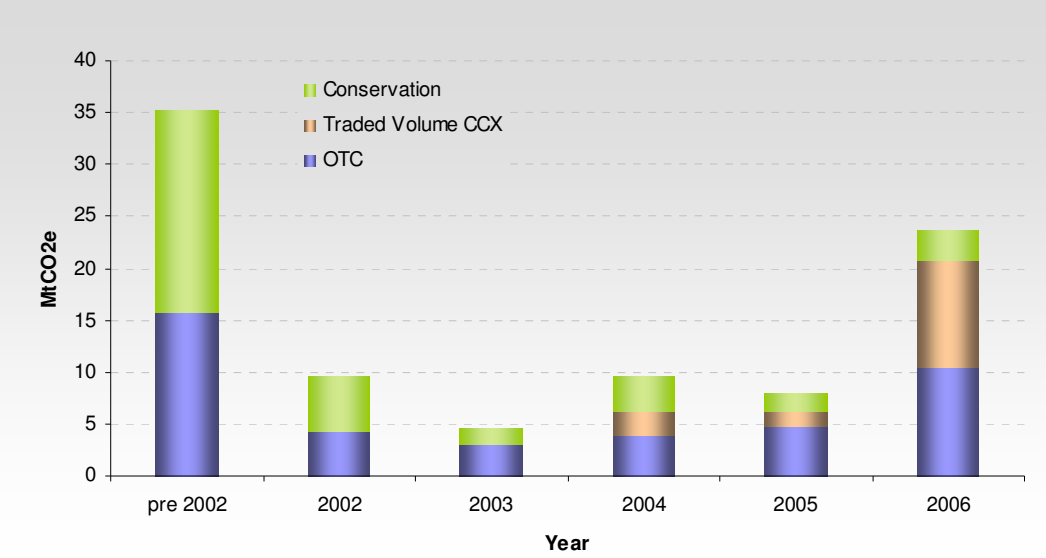
Compared to the other markets listed above, a unique characteristic of the OTC voluntary market, especially the retail component, is the huge number of transactions compared to transaction volume. For example, Dan Linsky of the retailer Drive Green explained that even including larger event and corporate orders, his average order is for 10.6 tCO_2e. Offsetting a vehicle use for a year requires purchasing only between two and six tonnes of tCO_2e. However, Jena Thompson of Conservation Fund's Go Zero noted that most of her customers offsetting home energy and travel purchase on average of 44 tCO_2e per transaction. While wholesalers and project developers will generally have larger transaction sizes than retailers, the relatively small trade sizes highlight the large number of entities (including individuals) providing market demand.

2006 was a year of record volumes for the voluntary carbon markets. CCX market volume grew by 610% and the voluntary OTC market grew almost 80% from just a year earlier. The survey asked suppliers to share transaction volume information for the years 2002 through 2006, and also compile any pre-2002 volumes. In total, we accounted for 86.8 $MtCO_2e$ transacted in or before 2006.

The voluntary offset markets were also robust before 2002, with a confirmed 35 $MtCO_2e$ transacted. Since our survey grouped all pre-2002 transaction volumes into one question, we were unable to track earlier market patterns. While these voluntary markets were barely under the media spotlight until 2006, it is clear carbon finance played a relevant role in reducing or sequestering emissions well before Kyoto markets arrived on the scene in 2004. Before 2004, we accounted for 48 $MtCO_2e$ transacted in the voluntary offset markets.

[28] World Bank, State and Trends of the Carbon Markets, 2007

Figure 3: Historically traded volumes in the voluntary carbon market



However, in the past four years the type of credits sold have begun to diversify as the market evolves. As illustrated in Figure 3, in and before 2002, as well as in 2004, transactions by several non-governmental conservation organizations utilizing carbon finance for afforestation, reforestation, and avoided deforestation projects were major contributors to total market volume. Since these sequestration projects take longer to generate credits, this pattern suggests that these may have been "ex- ante" deals, where buyers pay for credits before the sequestration has actually occurred.

As conservation organizations seek new ways of funding their missions, such transactions will likely continue. However, as the markets mature, the number of players has increased, voluntary carbon offsets are becoming more commoditized, and credit sources have become increasingly diversified. It is likely this market development will actually contribute to the ability of conservation organizations to harness carbon finance. For example, as a partner with The Nature Conservancy and Fundacion Amigos de la Naturaleza as project developers/managers in generating carbon credits from the Bolivia-based Noel Kempff avoided deforestation project, the Bolivian government has plans to sell its share of credits into CCX. On the flip side, as other players have joined the marketplace, it appears that carbon forestry deals do not enjoy the same level of support that they may have had in the early years of these markets and ex-ante deals may also be falling out of favor.

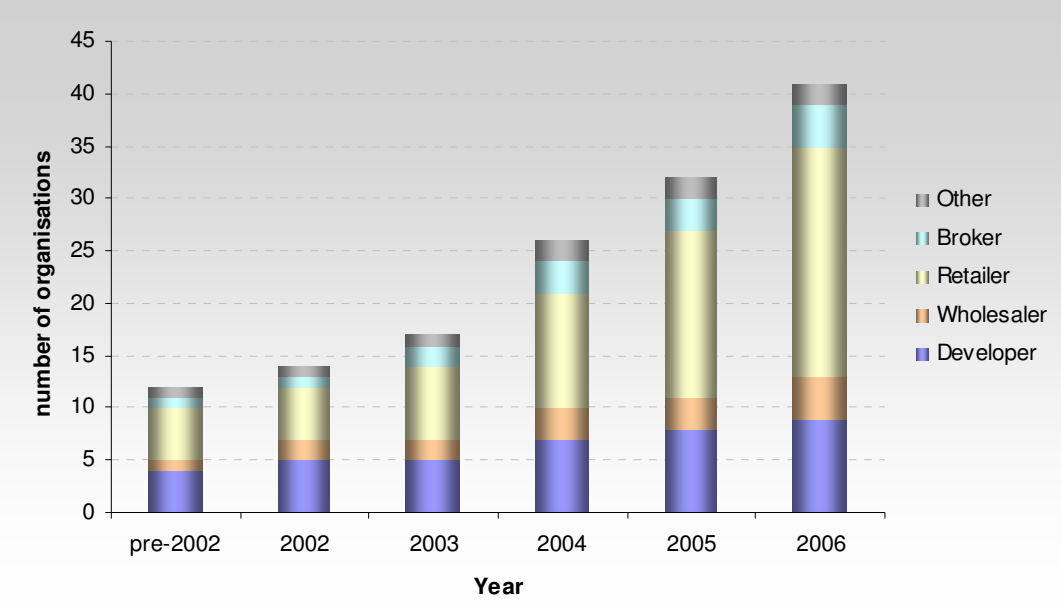
In 2004, the arrival of CCX was a significant development for the voluntary markets. Not only was it the first voluntary cap-and-trade system, but CCX has been a crucial component of the market (in terms of pure transaction volume) ever since 2004. In 2006, 43% of the total recorded volume of 23.7 $MtCO_2e$ took place through the CCX. The exchange itself has grown rapidly, especially in 2006, with average growth of 590% per year since 2003.

Picking up Participants

While transaction volumes in the voluntary offset markets have seen a bumpy ride between 2002 and 2006, the number of organizations supplying credits has grown consistently, increasing 220%. As shown in Figure 4 below, the highest growth rates in this period occurred between 2005 and 2006. From our preliminary research, it seems this growth rate will continue to increase in 2007. [29]

[29] Over 10 retailers currently in the marketplace did not begin selling credits until 2007 and hence were not included in this analysis.

Figure 4: Growth of organizations by primary business activity and year of first sale



Since numerous respondents operate at several levels in the value chain, volume of suppliers was analyzed in context of their primary business activity and their full range of business activities. Based on both the primary business activity and multi-business activities analysis, online retailers were the fastest-growing sector of the marketplace. Figure 5 highlights the 42.3% growth rate for retailers between 2005 and 2006. Comparatively, both brokers and project developers had much slower growth rates.

Our finding of slow growth in terms of project developers is partially due to the fact that one developer can supply credits to several buyers, but also because project developers had the highest transaction volumes of any other sector. Additionally, project development is a time-intensive task, and it may take several years for a project development business to get off the ground, whereas it is much easier to establish an offset retail company. However, as noted earlier in this section, the limited number of project developer respondents, especially those based in developing countries, may also be due to the fact that – while retailers and wholesalers are online and actively advertising – it is more difficult to access data about project developers around the world. Moreover, to simplify accounting and avoid double counting, we did not seek out suppliers of CCX credits for the survey because they were accounted for in CCX data.

In terms of share of transactions by organization type, the noticeable trend in the last few years has been the emergence of a higher number of transactions by brokers and retailers. In addition, carbon funds, which have previously focused their attention on compliance markets, have begun to dig into the voluntary side of the markets. For example, the Cheyne Carbon Fund in London recently announced it was focusing exclusively on voluntary projects. This trend is evidence of a maturing sector with increasing specialization in each stage of the supply chain. Figure 5: Transaction concentration by primary organization type shows that while roughly 95% of transactions were undertaken directly by developers in 2002, this share fell to just over 50% in 2006.

The other noticeable trend is that the market is now more competitive with more choice for buyers of offsets. Figure 6 shows that the volume of carbon credits sold by the five largest players in each year has reduced from 96% in 2002 to around 50% in 2006 (note that the largest players in each year may not be same).

Figure 5: Transaction concentration by primary organization type

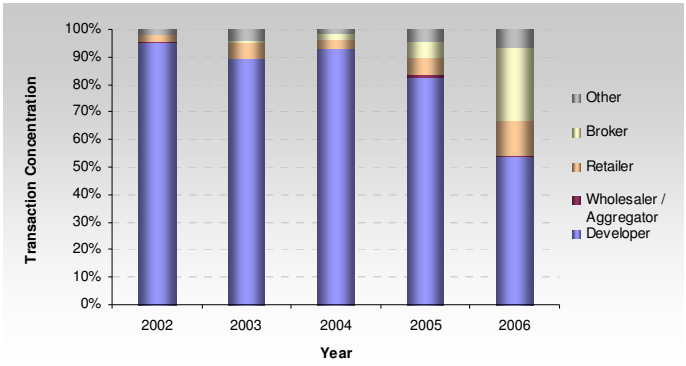
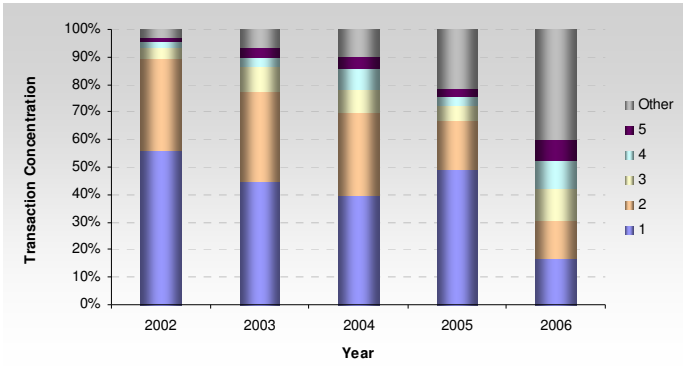


Figure 6: Transaction concentration by top 5 organizations



The lack of wholesaler/aggregators is primarily due to our categorization of "primary activity" and to the fact that very few organizations only sell aggregated credits in "bulk." For example, many retailers that sell to individuals also aggregate credits and sell in bulk at the "wholesale" level. Likewise, there is a large number of project developers selling directly to final buyers, but these were not included in the aggregator/wholesaler category.

It is also noteworthy that the predominance of large players in the market appears to have been decreasing ever since 2002. While in 2002 the market was dominated by three large players, by 2006 the top five organizations accounted for only 60% of the market. This was likely due to the fact that in 2002 the main transactions were large forestry-related deals being carried out by large conservation organizations, whereas by 2006 the market involved many more retailers, brokers, and project developers. This signals that the market is becoming more diverse and more competitive.

The Joys of Retirement

Because we primarily surveyed offset suppliers, it is difficult to accurately determine the number of credits retired by the marketplace. However, to provide a very rough estimate of these numbers, we assembled numbers from all the retailers that sold to final buyers, as well as a few of the wholesalers and project developers. From this analysis we believe **23.8 $MtCO_2e$** is likely to have been retired by the voluntary OTC markets to date, of which **4.2 $MtCO_2e$** were retired in 2006. Figure 7 shows total gross transaction volume in the OTC market from pre 2002 to 2006, along with our estimate of the credits retired by the marketplace each year (referred to as "net" transactions).

Figure 7: Historical OTC transaction volumes, total (gross, net)

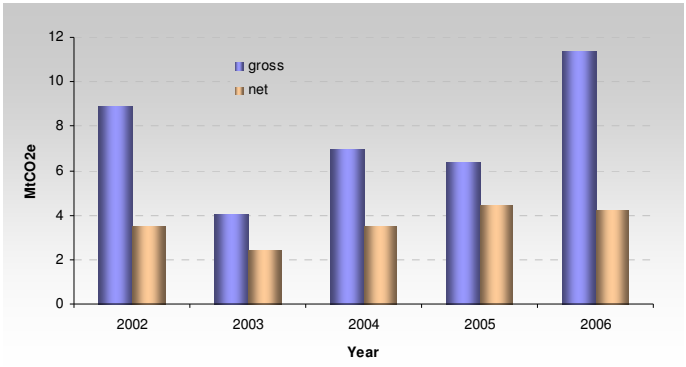
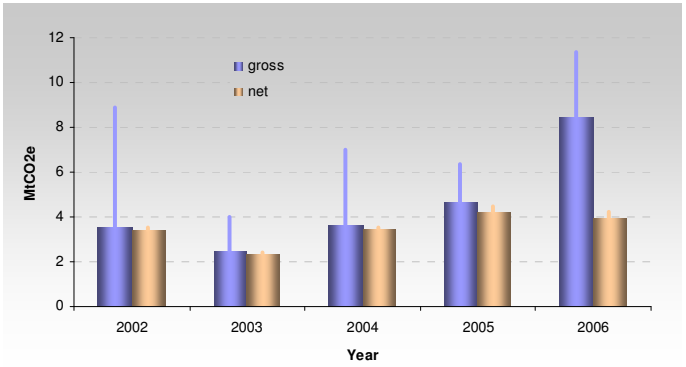


Figure 8: Historical OTC transaction volumes, excluding conservation projects



These figures correspond to previous research by New Carbon Finance that identified a total of 3.8 $MtCO_2e$ of demand-side transactions, and 3.2 $MtCO_2e$ supply side transactions

in 2006. Other recent research also indicates a range of around two to six $MtCO_2e$ retired in 2006.[30]

Given the difference in financing mechanisms between conservation and non-conservation type projects mentioned earlier, Figure 8 gives this same analysis for the non-conservation OTC market. The small difference in net demand between these two figures indicates the difficulty in estimating total retired volumes for conservation type projects.

It is interesting to note from Figure 8 that churn rates for the non-conservation type OTC market have increased exponentially from 2% in 2002 through 10% in 2005 to 114% in 2006. This is further evidence of the increasing transaction volume accounted for by brokers acting in the market.

[30] Harris, Elizabeth.(IIED) *Working Paper on The Voluntary Carbon Market: Current & Future Market Status, and Implications for Development Benefits.* <http://www.iied.org/CC/documents/FINAL_WorkingpaperforIIEDnefRoundtable_ElizabethHarris_2610061.pdf>.

5. The Origin of an Offset: Credit Sources

A Motley Crew: Marketplace Sources

Credits sold in the OTC market may be sourced from a variety of different markets or exchanges. For example, the US-based retailers Drive Neutral and Terrapass have in the past retired and sold CCX sourced credits. Whereas, one aggregator, South Pole Carbon Asset Management sells Gold Standard certified CDM credits to voluntary buyers. In the OTC market, about 17% of credits were sourced from the CDM market, 18% from the CCX market, and less than 1% from the JI, EU ETS, or NGAC market.[31] The remaining credits were either renewable energy credits or sourced specifically for the OTC market.

The Birthplace of a Credit: Project Types and Locations

Offset project type and location is an important differentiating factor for credits in the voluntary markets since suppliers are facing increasing pressure to be transparent about offset sources and it is widely assumed that the story behind an offset may influence customer choice. To gain further insights into the source of credits in the voluntary OTC market, respondents were asked to specify source of credits sold by broadly categorized project type and location.[32]

Table 3 shows all recorded OTC transactions across project types and locations in 2006. Response data includes about 26 credit suppliers, accounting for transactions of 9.7MtCO_2e in 2006. The data is presented in Figure 9and Figure 10.

Table 3: Recorded OTC transactions across project location and type (+ sign means that respondent indicated transactions of this type, but didn't provide volumes)

ktCO2	Asia	Africa	North America	South America	Europe & Russia	Australia / Other	Total	Percent
1. Forestry	19	328	2,343	659	128	28	**3,505**	**36%**
Afforestation / reforestation plantation	*18*	*4*	*6*	*193*	*0*	*0*	*221*	*2%*
Afforestation / reforestation mixed native	*1*	*308*	*2,337*	*157*	*128*	*26*	*2,957*	*31%*
Avoided deforestation	*0+*	*16+*	*0*	*309*	*0*	*2*	*327*	*3%*
2. Methane	28	0	184	1	39	0	**253**	**3%**
Methane - livestock	*28*	*0*	*42+*	*1*	*39*	*0*	*110*	*1%*
Methane - landfill	*0*	*0*	*39+*	*0*	*0*	*0*	*39*	*0%*
Methane – coal	*0*	*0*	*103*	*0*	*0*	*0*	*103*	*1%*
3. Renewable	1,823	188	296	456	300	111	**3,173**	**33%**
Off grid renewable energy	*823+*	*148+*	0	*205+*	*300*	*11*	*1,487*	*15%*
Renewable energy credits (RECs)	*1,000*	*40*	*296+*	*251*	*0*	*100*	*1,686*	*17%*
4. Energy Efficiency	251+	40+	28	7	106	87+	**518**	**5%**
5. Industrial Gas	0	0	1,183	800	0	0	**1,983**	**20%**
6. Mixed / Other	27	0	141	0	16	60+	**244**	**3%**
Total:	**2,147**	**556**	**4,175**	**1,923**	**589**	**286**	**9,676**	100%
Percent:	22%	6%	43%	20%	6%	3%	100%	

[31] 26 organizations accounting for transaction volumes of 6.8Mt or 68% of the total volume in 2006 replied to this question.

[32] For further insights into different project types, see Bayon, Ricardo, A. Hawn and K. Hamilton. 2007. *Voluntary Carbon Markets*. London, England: Earthscan.

Figure 9: Transactions by project location, 2006 (9.7Mt total)

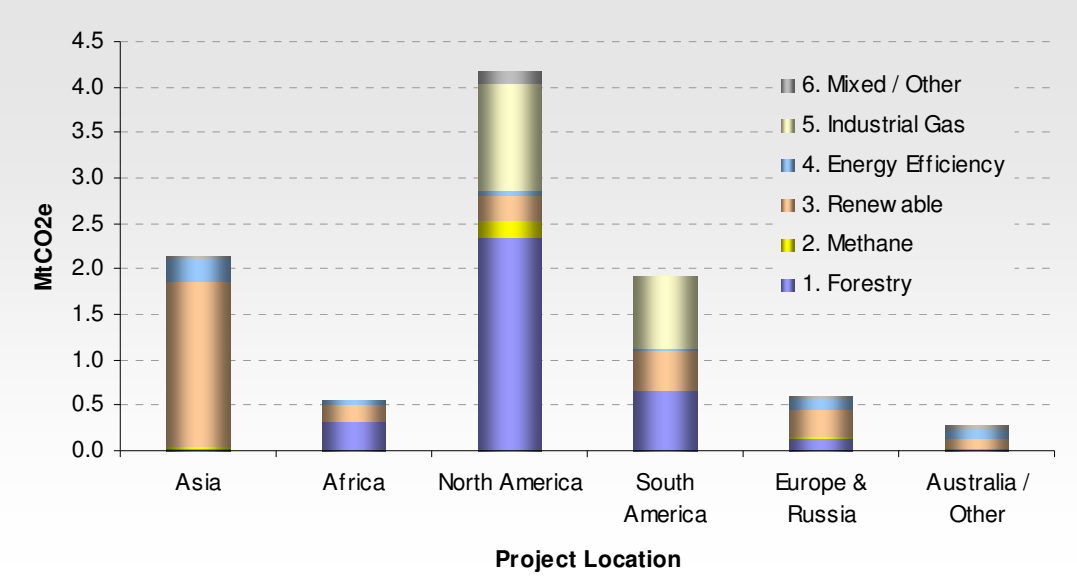
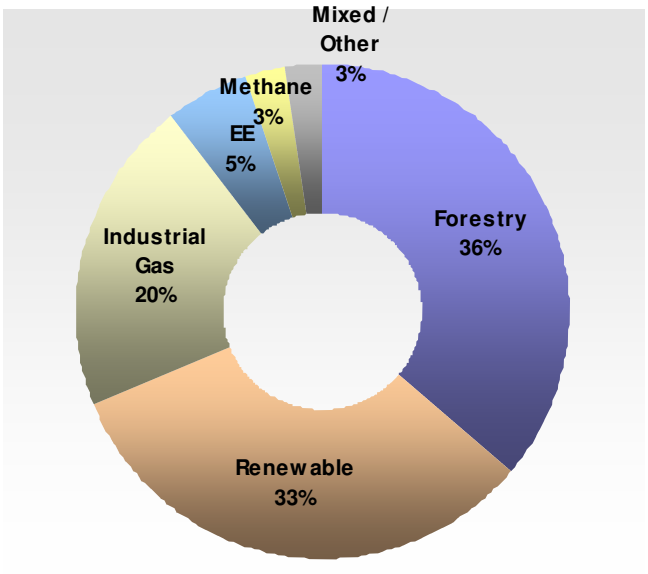


Figure 10: Transactions by project type (9.7Mt total)



LULUCF Offsets: Rooted in the Voluntary Markets

According to survey responses, three types of projects dominated this market in 2006: forestry, renewable energy and industrial gases. Of these, forestry accounted for 36% of the transaction volume. This finding roughly coincides with two other quantitative studies focused only on the retail offset market. A 2005 study by New Forests for the Ecosystem Marketplace on the retail market found that about half of retailer credits originated from forestry projects. Likewise, a 2006 IIED study reported that 45% of credits sold by 18

different retailers came from forestry projects.[33] Meanwhile, combined Agricultural Soil (25%) and forestry (13%) based credits made up 38% of credits registered under CCX.[34]

The predominance of forestry credits in voluntary carbon markets is not surprising. While forestry sequestration projects are widely accepted under the New South Wales Greenhouse Gas Abatement Scheme, these credits must be from local projects. In other words, outside of Australia, the Kyoto and voluntary markets are the only two outlets for forest-related sequestration credits. Compared to Kyoto markets, it's clear that the voluntary carbon markets play a critical role in financing sequestration projects. In 2006, less than 1% of CDM credits were sourced via approved forestry or the broader Kyoto category defined as Land Use, Land Use Change and Forestry (LULUCF) methodologies. As of early 2007, seven different afforestation/reforestation methodologies had been accepted by the CDM board.[35] However only one LULUCF project (compared to about 500 non-LULUCF projects) has actually been registered by the CDM and is being issued with CERs. Moreover, the EU ETS, the largest potential market for carbon offsets currently does not accept LULUCF credits of any kind.

In contrast, on the voluntary side, LULUCF projects may not only face lower financing and bureaucratic hurdles, but may also be valued more highly for providing more benefits to communities, to biodiversity, and to other values which voluntary buyers care about. They may, in other words, be more "charismatic." While not all forestry projects can boast high sustainable development co-benefits, and several projects have been criticized for negative social or environmental impacts, many projects (especially native forestry projects) do in fact result in ancillary social and environmental benefits beyond sequestration. Moreover, LULUCF credits may be appealing because they are simple to understand: Most consumers have an intuitive understanding of the role trees play in the carbon cycle. The same cannot be said for exotic chemical gases such as HFC_{23} and N_2O. Erin Meezan of Interface explained that her company chose forestry credits from major tree planting projects to offset their in-house emissions because, "Trees is one area of carbon sequestration that everyone understands, even little kids understand it… people get it."

Due to concerns about permanence (i.e. carbon stored in trees may be released into the atmosphere if the forests burn down or are felled by disease) and further investments in abatement technologies, the percentage of forestry credits provided to the market has decreased rapidly, especially in the EU, and especially in the retail sector. Conversely, forestry carbon projects have historically played an important role in the US voluntary carbon markets. For example, the first protocol approved for offsets by the California Climate Action Registry was the forestry protocol. In the voluntary OTC market, about 66% of these forestry based credits originated from US projects. Whether a backlash against forestry carbon of European proportions will some day emerge in the US still remains to be seen. So far, forestry projects have been highly valued in the US voluntary markets, and their future role will largely be dictated by how the main criticisms of carbon forestry (additionality, measurement, and permanence) are dealt with. One interesting development is that some organizations have proposed innovative approaches (namely insurance schemes) for addressing the permanence problems associated with forestry carbon.

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[33] Harris, Elizabeth. (IIED) Working Paper on The Voluntary Carbon Market: Current & Future Market Status, and Implications for Development Benefits. 26 October, 2006. http://www.iied.org/CC/documents/FINAL_WorkingpaperforIIEDnefRoundtable_ElizabethHarris_2610061.pdf

[34] CCX (Chicago Climate Exchange). 2007. CCX Registry Offsets Report. <http://www.chicagoclimatex.com/offsets/projectReport.jsf> (Updated July 17).

[35] CDM (Clean Development Mechanism), UNFCCC (United Nations Framework Convention on Climate Change). 2007. Baseline and monitoring methodologies <http://cdm.unfccc.int/methodologies/index.html> Updated July 11.

Industrial Gases: A Disappearing "Low Hanging Fruit"?

As in the CDM market (where in 2006 HFC credits and N_2O credits respectively accounted for 34% and 13% of market share), destruction of industrial gases with high global warming potentials (GWP), including N_2O and HFC, were a major portion of the voluntary markets, accounting for 20% of all transactions. Due to the very high GWP of these gases, their destruction can generate offsets quickly and effectively and is often considered the 'low hanging fruit' of offset projects. Whereas forestry carbon credits are highly valued in cases where buyers are looking for "gourmet" or "charismatic" carbon, industrial gases tend to play a bigger role in cases where buyers want large volumes of offsets and care little about where these tonnes come from (i.e. in the "commodity carbon" side of the market). As noted by Waldemar Perlik, Vice President of Voluntary Markets at MGM International, "I don't care what shape or color a VER is, reducing these high global warming potential l greenhouse gases, from any environmental perspective, is crucial."

While it is clear that destruction of these high GWP gases will play a critical role in the fight against climate change, trends appear to indicate that their use in the voluntary markets may decrease. This could be due to issues such as the treatment of new HFC facilities under the CDM, lack of sustainable development co-benefits and/or because of a theoretically limited supply of these types of credits. However, according to some sources, in the case of the voluntary markets, because new HFC producing facilities, which are not eligible under CDM are offering to sell VERs there is huge potential industrial gas supply for the voluntary market. The question is, at what point are buyers still interested? Partly in response to stakeholder concerns about such transactions, one of the new standards proposed for the voluntary OTC market (the European Carbon Investor Services: Voluntary Offset Standard) has already proposed that it will not certify HFC destruction credits..

Project Based Credits in the CCX

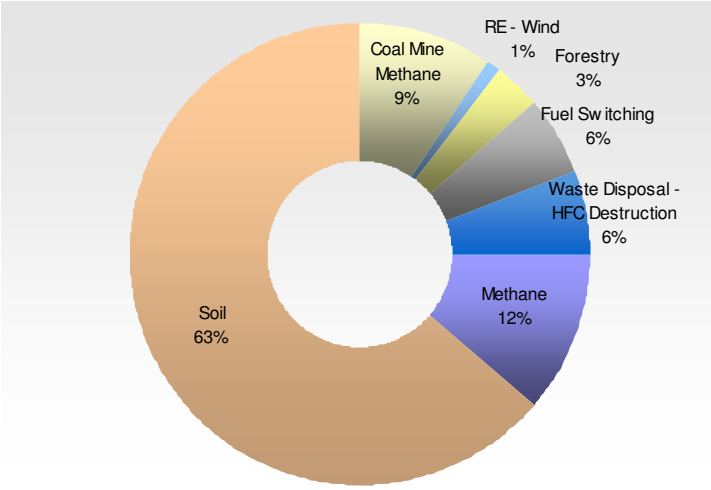
As noted in Section 3, CCX trades both allowance-based credits and project-based offset credits. In 2006, CCX issued and registered 4,461,200 offset credits.[36] Through the survey we were also able to compare distribution of offset project types *registered* in CCX in mid-2006. This data was not incorporated into our OTC market data because a lack of accessible data prevented us from analyzing the project type distribution of credits *sold*. However, this registry still provides critical insights into project types in the voluntary carbon markets.

For example, a surprising result of the survey analysis was the relatively low percent of methane credits in the market. The fact that 21% of CCX offset projects are agricultural or landfill methane may mean that many project developers capturing and flaring methane, especially those in the United States, are choosing to sell their credits into CCX rather than through the OTC voluntary markets.[37] Moreover, soil conservation credits have flooded the CCX market, only a small number of which were accounted for in the OTC market.

[36] CCX (Chicago Climate Exchange). 2007. CCX Registry Offsets Report. <http://www.chicagoclimatex.com/offsets/projectReport.jsf> (Updated July 17).

[37] Two CCX methane offset provider/ aggregators are located internationally in Germany and New Zealand

Figure 11: Distribution of Project Types on the CCX



Mingling Markets: RECs and VERs

Together, Renewable Energy Credits (RECs) and other renewable energy projects accounted for 33% of the voluntary OTC market. It is likely that renewable energy projects (especially off-grid projects or projects in countries without tradable renewable energy credits), will continue to be a major component of the OTC voluntary markets. For example, the Gold Standard certification program will only certify renewable energy and energy efficiency projects. Moreover, unlike industrial gas and forestry credits, renewable energy credits remain relatively uncontroversial.

Alternatively, the use of RECs as offsets is a highly controversial issue for the OTC market. RECs, also referred to as Tradable Renewable Certificates (TRECs) or Green Tags, are tradable certificates representing the environmental attributes from the generation of one kilowatt hour (kWh) of on-grid renewable energy. Because RECs result from grid-connected renewable energy projects, the energy electrons from renewables are mixed with energy electrons from other forms of generation. Hence, it is impossible for consumers purchasing renewable energy to consume only electrons from renewable energy. However, RECs were designed to facilitate support of renewable energy projects "free of the constraints of the energy grid."[38] They are a separate commodity from the power itself and the environmental attributes of a unit of energy. Packaged in a REC, they essentially represent the benefits of displaced pollution. Like the carbon markets, regulated and voluntary REC (or equivalent) markets exist in the United States, Europe and Australia. In 2005, RECs representing 3,890 million kWh were purchased voluntarily in the United States.

The debate over the use of RECs in carbon markets relates to the question of how and if RECs (which are measured in kWh) should be converted into a tCO_2e. At one level, voluntary purchases of RECs are closely linked with interest in emissions reductions and the demand for RECs could, in many cases, be construed as a latent demand for carbon emission reductions. However, RECs are measured differently from carbon offsets, so suppliers must effectively convert from one market's unit of measurement into the other.[39] The issue has become particularly prevalent in cases where retailers and consumers, seeking some form of quality-assured carbon credits, found themselves in a market without solid carbon standards, and in a situation where there existed a coherent and well-respected methodology for renewable energy certification (namely, Green-e certification).[40] Given this dilemma, many of them chose to buy Green-e RECs as

[38] Leahy, Patrick and Hathaway, Alden. "Renewable Energy Certificates and Air Emissions Benefits: Developing an Appropriate Definition for a REC." Environmental Resources Trust. April 2004.
[39] For more information this conversion process see. Harmon, Robert. "Renewable Energy Certificates and carbon offsets: What informed customers need to know." *Voluntary Carbon Markets*
[40] Bayon, Ricardo, A. Hawn and K. Hamilton. 2007. *Voluntary Carbon Markets*. London, England: Earthscan pp. 44.

something of a substitute for non-existent verified and certified carbon credits. Moreover, in some cases REC prices dropped to levels that made them particularly attractive (if not exactly equivalent) substitutes for carbon offsets.[41]

As of mid- 2007, several retailers, such as Bonneville Environmental Foundation, do sell carefully converted Green-e Certified RECs as carbon offsets. However, these approaches have been criticized, and the situation may change as at least one major renewable energy certifier (the Center for Resource Solutions which puts out the Green-e certification) begins also certifying carbon offsets (see below).

GHG Globetrotters: Project Location

Compared to the CDM market, the voluntary offset market has a different distribution of project locations and a lower percentage of credits from Asia and more credits from Africa. In 2006, 80% of the transacted CDM volume was supplied by Asia, with China capturing a 61% of market share.[42] In the voluntary markets, on the other hand, only 22.2% of reported voluntary offset credits were sourced from Asia. In contrast, Africa sourced 3% of CDM transaction volume as it provided nearly 5.7% of reported voluntary offset credits.

In part, this may be due to the high transaction costs and costs of entry associated with creating a CDM credit as compared to a voluntary offset credit. But it may also be due to the fact that Africa, unlike Asia, has few industrial carbon credits it can offer the CDM markets, whereas it can be a major source land use, land use change, and forestry credits. LULUCF, in other words, is where Africa's comparative advantage lies in the carbon markets. And, as was mentioned above, LULUCF credits played a smaller role in regulated markets than they did in voluntary markets. As shown in Figure 9, over half of the African credits entering the voluntary markets came from forestry projects. This could be because it is possible that there are more sellers of voluntary carbon credits in Asia that did not fill out our surveys.

Project Size

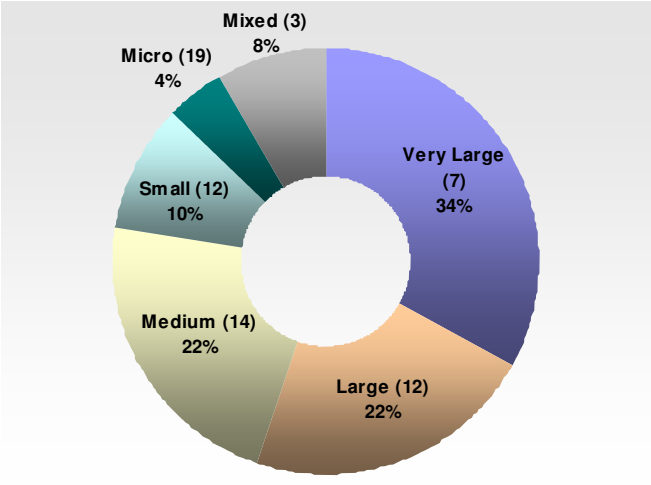
Offset projects in the voluntary market ranged from large-scale anaerobic digesters used to reduce methane emissions, to small biogas stoves used in village huts. Based on CDM definitions of small scale activities (less than 15,000 tCO_2e/year) and feedback from several suppliers, we set the definitions of size as follows:

- Micro (less than 5,000 tCO_2e/year)
- Small (5,000 to 15,000 tCO_2e/year)
- Medium (20,000 to 100,000 tCO_2e/year)
- Large (over 100,000 tCO_2e/year)
- Very large (over 500,000 tCO_2e/year

The survey results are shown in Figure 12. As might be expected, the majority of credits in the OTC markets originated from very large projects. However, more respondents cited selling credits sourced from micro projects than any other project type. The large number of small and medium projects has important implications for sustainable development benefits and the role that the voluntary market may be able to play in financing projects which may not be able to bear relatively high transaction costs per credit generated, especially since it has been commented that large projects have by far dominated the regulatory and voluntary markets.[43] Economies of scale, in other words, are great if you are interested in profiting from the carbon markets. They may be more problematic if you are trying to ensure sustainable development benefits and provide funding for small communities in developing countries.

[41] Trexler, Mark. "Renewable Energy Credits to Carbon Offsets; What's the Right Exchange Rate?" in R, Bayon, A Hawn and K, Hamilton, *Voluntary Carbon Markets*.
[42] World Bank. *State and Trends of the Carbon Market, 2007.*
[43] Clarke, Donna. 2002/2003. Scaling Down Carbon Finance. *Environmental Finance*.

Figure 12: Transaction Volume by Project Size, 2006



6. Voluntary Offset Credit Prices

Through the survey we also asked respondents to specify not only the numbers of offset credits sourced from various project types and their location, but also the price of those credits in US$.

In a fragmented and highly heterogeneous market such as the voluntary carbon markets, price ranges are understandably large. Respondents cited prices ranging from $0.5-45/ tCO_2e with the highest price paid for a credit being a massive 8900% higher than the lowest. This large range roughly coincides with two other studies on the market. An IIED report noted retail prices ranging from £0.27 to £20.55 and a Caisse des Dépôt study observed even greater price ranges; from US$1 to $78.[4445] In 2006, CCX prices ranged from less than US$1 to almost US$5.

Prices, however, can be compared at several levels: project type, project location, customer location, and supplier location in the value chain. Two of the most important variables that contribute to the final VER price appear to be: (1) the cost of the offset project and (2) the cost of getting the credit to the final buyer. Project cost, in turn, is influenced by three major factors: technical costs (influenced by factors such as project type, size, location, upfront costs vs. length of return, profits from co- benefits and additionality), transaction/ administration costs (ex. verification), and project developer's profit.[46] Market price, meanwhile, is influenced by several factors, such as number of steps in the value chain between the project and the buyer, certification, advertising, monitoring and final supplier profit.

Value Added: Pricing Up the Value Chain

Our survey showed that, on average, prices charged for offsets increased as they went up the value chain. This was to be expected. Average prices charged by retailers were $8.04/ tCO_2e, as compared to brokers who charged US$6.03/$tCO_2e$, and wholesalers / aggregators who charged $5.31/$tCO_2e$, and project developers who charged US$3.88/tCO2e. See Figure 13. The numbers in brackets refer to the number of data points for each project type.

Such price increases may equate to a greater percentage of transaction costs in the final cost of a credit. However, it is important to mention that not all credits pass through every possible step in the value chain. For example, one retailer citing high prices noted that he worked directly with a project developer and the high price derived from the expenses of rigorous standards aimed at ensuring additionality and co-benefits. From the context of this study, it is not possible to analyze the level of value added by each step in the supply chain, nor is it possible to determine whether all of the cost increases are warranted.

However in this "wild west," buyer-beware marketplace, numerous suppliers and final buyers note that the cost of standards, certification and verification is critical. Likewise, having credits reliably screened by a middleman may have a very high value to some buyers. Alexander Rau, of Climate Wedge, which serves as an advisor to the Cheyne Carbon Fund, explains the fund's value added as, "going way beyond just a quality screen." "With our portfolio," he says, "we manage a series of risks, including long-term delivery, project performance, and liability, for the final buyer—which is particularly important in these voluntary markets." Moreover, the ability to purchase small amounts of

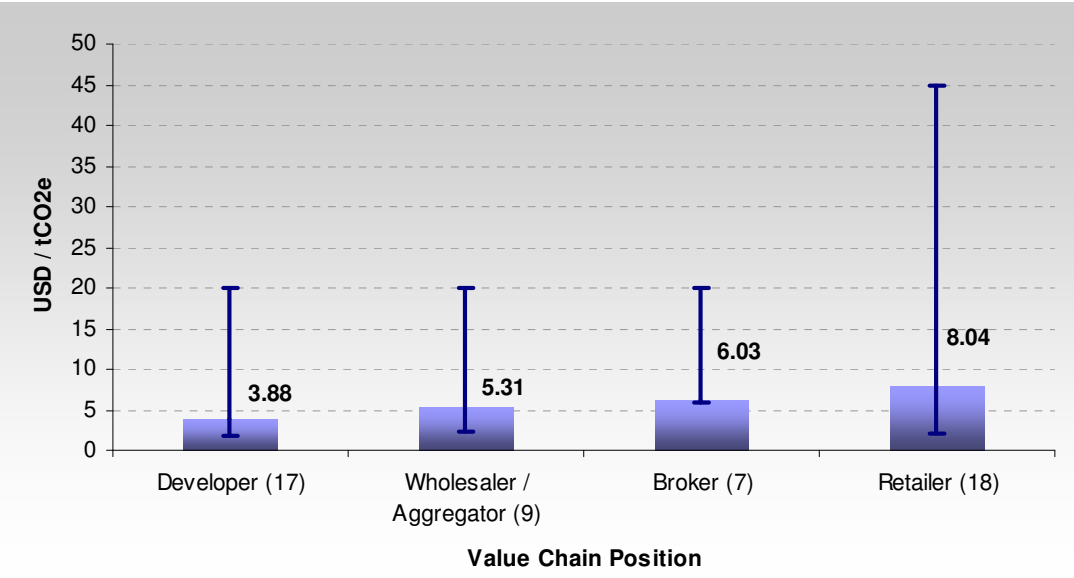
[44] Harris, Elizabeth. IIED (International Institute of Environment & Development) *Working Paper on The Voluntary Carbon Market: Current & Future Market Status, and Implications for Development Benefits.* <http://www.iied.org/CC/documents/FINAL_WorkingpaperforIIEDnefRoundtable_ElizabethHarris_2610061.pdf>.

[45] V. Bellassen and B. Leguet (2007). Voluntary Carbon Offsets: the Awakening. Caisse des Dépôts Climate Taskforce, Research report N°11. *World Bank State and Trends, 2007.*

[46] Butzengeiger, Sonja. *Report No. 1: Voluntary Compensation of GHG- emissions: Selection criteria and implications for the International Climate Policy System*. pp 26.

credits from a retailer may be the only way buyers are able to offset relatively small amounts of emissions.

Figure 13: Price By Primary Business Activity



VER Prices by Project Type

In addition to their location on the value chain, the price of a VER is influenced by project type. The survey results are presented in Figure 14. Because we surveyed suppliers and sellers at all levels of the value chain but did not have an equal representation in each project type, presenting a weighted average simply by project type gave slightly skewed results. Hence, only the weighted averages of retailers are presented.

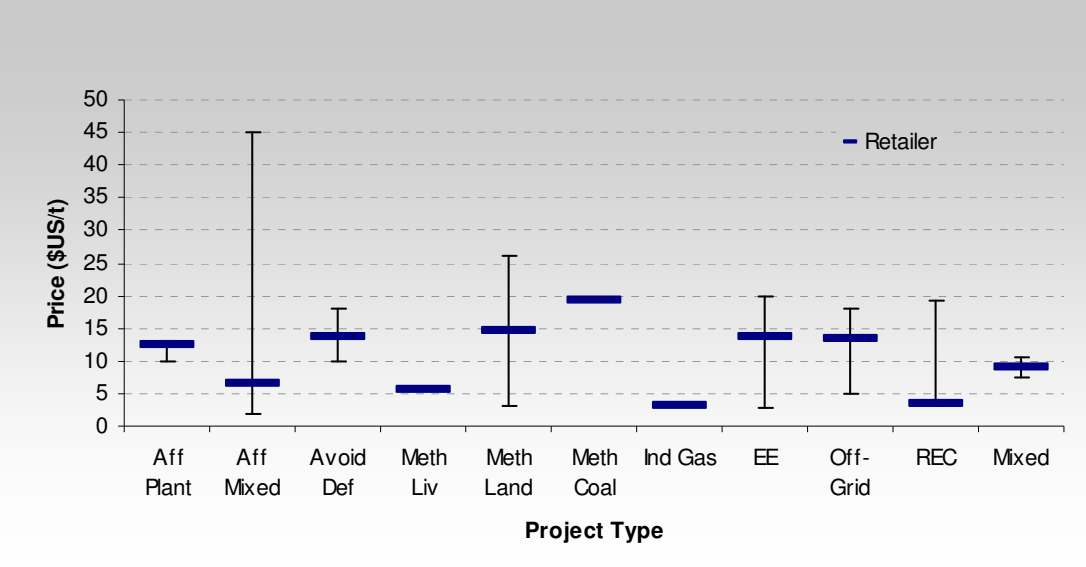
From these results we can see very large ranges even within a given project type. For example, some of the highest and lowest prices were for mixed native afforestation/ reforestatation projects. The highest price of US$45/tCO$_2$e was for a micro-sized afforestation deal in the EU, corresponding to a Euro price of around €34/tCO$_2$e, which is 10% higher than any historical trade of European emission allowances.

The weighted average by project type ranged from US$2.50 (for RECs) to $ 20.00 (methane/coal). However, since we had only one data point for a retailer selling carbon credits from a coal mine methane project, it is likely that this number is not completely representative. At the retailer level, most project types (including plantation forestry, avoided deforestation, landfill methane, direct fossil fuel reduction, and off-grid renewable) generated offsets selling between US$10-15/tCO$_2$e. Because of the large volume of less expensive credits the average price was closer to US$8.04/tCO$_2$e.

We have included one data point for industrial gases and geological sequestration, but it should be noted that these are not from a retailer, but rather from a project developer. Although no retailers did reply to this question, these types of credits are available at a retail level via Natsource LLC. As one of the sellers recommended by Environmental Defense, the company offers credits from Dupont's voluntary HFC23 reductions, as well as from an enhanced oil recovery project in Wyoming.[47]

[47] Natsource. Fight Global Warming. <http://www.natsource.com/buycredits/index.asp?co2tons=>.

Figure 14: VER Prices By Project Type



Note – The Industrial Gas price is not from a retailer as no retailer data was provided in the survey, the price if from a developer.

Table 4: VER Prices By Project Type

Project Type	Price Range (US$/tCO2e)
Afforestation/ reforestation monoculture	10 – 13
Afforestation/ reforestation mixed native	0.5 – 45
Avoided deforestation	10 – 18
Methane- Livestock	6
Methane- Landfill	0.75 – 26
Methane- Coal mines	20
Industrial gas	4 [48]
Direct Fossil Fuel reduction	0.5 – 20
Off- Grid Renewable	5 -18
RECs	0.75 – 20
Mixed	7 – 10

Note: + indicates that respondent indicated this project type but did not specify volumes

VER Prices by Customer Location

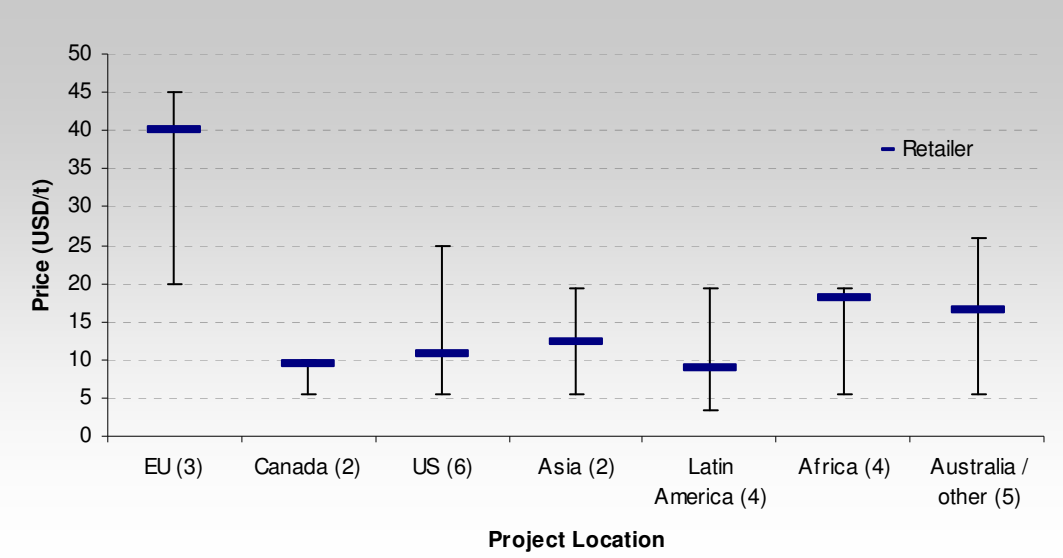
Respondents specified price not only by project type but also project location. As with our comparison by project type above, we show a total range of prices as well as a weighted average from all organizations that defined themselves as retailers. The results are shown in Figure 15.

This shows that the most expensive credits were born in the EU. The high retail price of credits in the EU can be explained in several ways: Firstly, by the end of 2006 the exchange rate was such that it gave comparatively higher EU prices when expressed in USD terms.[49] Secondly, because the EU was under a cap-and-trade system, and the first phase of the scheme (2005- 2007) included 2006, major CO_2 producing sectors were engaging in the EU ETS. Hence, much of the 'low hanging' carbon 'fruit', such as was

[48] Natsource. Fight Global Warming. <http://www.natsource.com/buycredits/order.asp?mod=add>.
[49] In December 2006, €1 equaled about US$1.32.

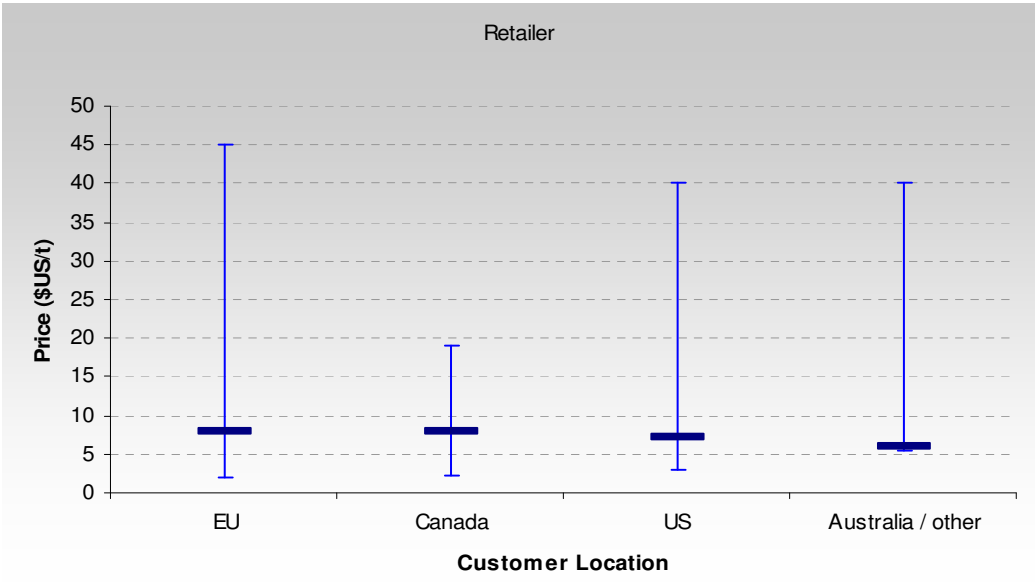
available in the United States, was not available in Europe. Third, the existence of a regulated carbon market in Europe may have created greater awareness of climate change and the concept of carbon offsets in Europe, allowing retailers to charge higher prices and/or creating a demand for more rigorously sourced credits.

Figure 15: 2006 Prices by Project Location (retailers only)



However, while credits sourced from the EU are generally more expensive, it doesn't follow that Europeans are paying more for voluntary credits. Figure 16 illustrates the price based on customer location as reported by our survey respondents. Not surprisingly, there were almost no reports of final customers based outside of the EU, North America or Australia. When purchasing from a retailer, it seems, and without taking exchange rates into account, there is relatively little difference between the prices paid by location of the buyer, although EU buyers do tend to pay slightly more than buyers in the US or Australia. That this differs from the analysis of price by location of project either indicates that the data is too variable to draw conclusions at this level of detail, or that higher priced credits are exported from Europe.

Figure 16. Price by Customer Location



Price and Project Size

In terms of project size, the prices from the survey quite predictably confirm the impact of economies of scale. In other words, larger volumes demand lower per unit price. For instance, micro-scale projects of less than 5,000t have a volume weighted price of around $5/t, whereas very large projects show a volume weighted price of around $2/t. No surprises here.

From Commodity to Philanthropy

Further complicating a thorough analysis of the price of VERs is the fact that some carbon sellers are non-profits that permit their buyers to take tax deductions at the same time that they buy carbon. For example, of the 68 carbon offset sellers surveyed, 27 are non-profits.[50] Out of these 27, 17 structured offset purchases as tax-deductible donations, though there is some variance regarding the nature of these donations and impact of tax deductions in different countries. Tax deductions are highly relevant to price since they can ultimately decrease the real cost of offsetting to a customer. A key issue for whether carbon credits can be considered tax deductible donations relates to retirement (if they are to become offsets immediately) and transfer of ownership. For example, almost all the organizations which structured carbon credit transactions as tax-deductible donations do not transfer ownership to consumers, but rather retire the credit on behalf of their clients following a donation. Several other non-profits supplying or facilitating carbon credits noted that because their transaction structures do allow for transfer of ownership, they do not structure carbon credit transfers as philanthropic donations. They did add, of course, that tax-deductible donations are accepted for other work unrelated to carbon offsets.

[50] This was a follow up question to survey responses. 23 out 27 non- profits responded.

7. Standards & Registries

Quality, Quality, Quality: Challenges for the Voluntary Market

While the price of offsets is, understandably, of great interest to both buyers and sellers in this market, no single issue surrounding the voluntary carbon markets has generated quite as much discussion as the issue of quality. For the past several years, concerns have mostly been raised by stakeholders deeply involved in the voluntary carbon markets. However, in the first six months of 2007, stories critical of carbon trading – and especially the OTC voluntary markets — appeared in publications as diverse as *Newsweek, Business Week, The San Francisco Chronicle, the Christian Science Monitor, The Financial Times*, and *The Guardian*, among others. The articles have argued that: (a) offsets divert attention from the real need for emissions reductions; (b) offsets in the voluntary market are of questionable quality and/or are not "additional" to business as usual; and (c) that they contribute very little to the ultimate goal of addressing climate change. In many cases, offsets have been compared to the "indulgences" purchased during medieval times to expunge a person's sins.

For example, a March 2007 *Business Week* expose on the market highlighted a key issue for the market, additionality. In other words, it noted that to be considered an offset, carbon credits must actually reduce emissions more than would have happened normally without the purchase of the credit. It stated: "…a close look at several transactions…reveals that some deals amount to little more than feel-good hype. When traced to their source, these dubious offsets often encourage climate protection that would have happened regardless of the buying and selling of paper certificates."[51]

In part, recent exposes can be attributed to standard media cycles. It is well-known among media professionals that when something is new, it is first the subject of numerous very positive articles; a "honeymoon period," if you like, where the perceived benefits of the new trend or technology are hyped to varying degrees. This initial period of fascination then turns to disappointment when the newness of a trend is no longer "media-worthy." We believe this is the stage we are currently in with the voluntary carbon markets. Following these two first stages, it is common to see a more moderated approach to media coverage of the new technology that sees it for what it is: neither silver bullet, nor fools' gold. If this is a media cycle, we may soon be entering that final, more moderated stage.

Regardless of whether the spate of bad press aimed at carbon offsetting is part of a media cycle or not, it is important to note that the bad press could still have very real consequences for market demand and, therefore, for the future of the market as a whole. Real or not, fact or fiction, in a voluntary market perception is reality and the sustained media criticism will likely be felt sooner or later in terms of demand.

On a more positive note, the increased media attention may not be all bad. It might actually serve to strengthen the market. As the market feels itself more closely watched, it will pay closer attention to quality, to customer service, and to information; three elements that we think are essential if this market is to grow and thrive.

However, it is important to note the majority of efforts to legitimize the market were initiated before the slew of exposes in 2007. For example, in the past 18 months there have been a range of efforts to shape the OTC voluntary carbon market into a more consumer friendly arena. These efforts include: analysis and reviews of retailers, offsetting guides, standards & certification programs, and registries.

In 2006 and early 2007, several non-profit organizations based in the United States worked to screen offset retailers for individual and corporate consumers. For example,

[51] Elgin, Ben. 2007. Another Inconvenient Truth. *Business Week*. March 26. <http://www.businessweek.com/magazine/content/07_13/b4027057.htm>.

Environmental Defense[52] listed recommended offset retailers on its website, and both Clean Air Cool Planet[53], and Tufts University[54] produced Consumer Report-type guides to different retailers. To help guide corporations through the process of offsetting and navigating the voluntary carbon markets, organizations such as the Carbon Trust, the Ecosystem Marketplace, Business for Social Responsibility, and F&C Investments[55] have all written basic guides to offsetting.

Such efforts are an important part of helping potential customers navigate the market. However, most major market players agree that, in the end, standards and registries will be needed in order to truly increase the legitimacy of the marketplace. Because standards and registries will inevitably become central to the future strength of this market, the following sections are dedicated to outlining the current state of play in their development.

Ensuring a "Ton is a Ton": Standards, Protocols and Certification programs for the Voluntary Carbon Markets

As was indicated above, the voluntary carbon markets have become fertile ground for the development of protocols, standards and certification programs designed to ensure rigor and quality at various levels in the supply chain.[56] In fact, the arena of standards is evolving so quickly that most of the standards described below did not exist in 2006, and two of the standards mentioned had not even been announced prior to March of 2007 when the initial survey for this report was distributed. And, while these new standards could not be included in our quantitative analysis of the market, they are outlined in the section below.

In the standards arena, similar terms may cover a diverse range of activities. Based on programs use of the words, the terms Protocols and Standards are used interchangeably. Guidelines are less prescriptive and are generally not part of a certification system. The term certification includes both a standard and the next step of verification to that standard.

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

Then there are retailer-created standards, which had historically been developed by retailers (e.g. the Carbon Neutral Company, MyClimate, and various others) to ensure and guarantee quality in their portfolios. While these standards have been critical in ensuring

[52] Environmental Defense. Neutralize Your Pollution. <http://www.fightglobalwarming.com/page.cfm?tagID=270>.

[53] Trexler Climate and Energy Services. *A Consumers' Guide To Retail Offset Providers*. December 2006. <http://www.cleanair-coolplanet.org/ConsumersGuidetoCarbonOffsets.pdf>.

[54] Kollmus, Anja and Bowell, Benjamin. *Voluntary Offsets for Air-Travel Carbon Emissions*. Tufts Climate Initiative December 2006 <http://www.tufts.edu/tie/tci/pdf/TCI_Carbon_Offsets_Paper_April-2-07.pdf>.

[55] *F & C Guide to Carbon Offsetting*. F & C Management Limited. 2007 <http://www.fundworksinvestments.com/fn_filelibrary/File/Carbon%20Offsetting%20-%20FINAL%205107.pdf>.

[56] In this section a certification program is defined as program which abides specific standards but also utilizes a logo or brand to certify a product/ project has been verified to these standards.

quality in the market prior to 2006, they can be seen as engendering conflicts of interest and are likely to be abandoned in favor of third-party standards in the future.

For the purpose of this report, we've focused on standards specifically for carbon offsets or offsetting. However, a variety of standards and protocols are in existence for voluntary direct corporate emissions reporting.

WBCSD/ WRI GHG Protocol for Project & Corporate Accounting

The World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI) Protocol for Project Accounting (WBCSD/WRI GHG Protocol) is a widely-accepted set of guidelines used by project developers and incorporated into numerous standards, such as the CCAR Protocols and ISO 14064. The GHG Protocol "aims at harmonizing GHG accounting and reporting standards internationally to ensure that different trading schemes and other climate related initiatives adopt consistent approaches to GHG accounting."[57] This Protocol was created along with a GHG Corporate Accounting and Reporting Standard. Neither the GHG Protocol nor Corporate Standard is a certification system or verification standard itself.[58]

The California Climate Action Registry's Protocols

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

ISO 14064

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

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

Like the Voluntary Carbon Standard, ISO 14064 was created to ensure that "a tonne of carbon is always a tonne of carbon."[59] The ISO standards were not created to support a particular GHG program, but were instead designed to be "regime neutral" such that they could be used as the basis for any program. ISO does not certify or register GHG emissions or credits but due provide accreditation, validation/verification, quantification and reporting architecture.

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[57] *GHG Protocol Initiative: For Project Accounting.* World Business Council for Sustainable Development and World Resources Institute. <http://www.ghgprotocol.org/templates/GHG5/layout.asp?MenuID=849>.

58 GHG Corporate Accounting and Reporting Standard. World Business Council for Sustainable Development and World Resources Institute. ttp://www.ghgprotocol.org/templates/GHG5/layout.asp?type=p&MenuId=ODk2>.

[59] Weng, Chang Kook and Boehmer, Kevin. *Launching of ISO 14064 for greenhouse gas accounting and verification.* ISO Management Systems. March, April 2006. <http://www.csa.ca/climatechange/downloads/pdf/ISO_Management_Systems_14064_Article.pdf>.

Climate Neutral Network

Several US-based companies working to offset their emissions have linked with the Climate Neutral Network, a non-profit with the goal of "helping companies, communities and consumers achieve a net zero impact on the earth's climate."[60] The organization certifies products, events or organizations with its Climate Cool logo as a brand trade-mark. Climate Neutral Network certifies projects and also works directly with institutions to become 'net zero' emitters or to create products for the consumer market. Examples of events and products certified by Climate Cool include: a concert tour by the Dave Matthews band; the business operations of Shaklee US; and Interface's Climate Cool carpet product. The Network has also certified two organizations selling retail offsets: Bonneville Environmental Foundation and Triple E Better World Travel.

Climate, Community, and Biodiversity (CCB) Standards

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

Greenhouse Friendly

The Greenhouse Friendly Initiative is the Australian Government's voluntary carbon offset scheme for encouraging GHG emissions reductions at several levels including, "providing businesses and consumers with the opportunity to sell and purchase greenhouse neutral products and services."[61] The Initiative provides two different services: (1) "Greenhouse Friendly Abatement Provider" (offset project) certification; and (2) certification of "carbon neutral" products and services.[62]

Criteria for Greenhouse Friendly project certification include: being Australia based, generating "additional, permanent and verifiable greenhouse gas emissions reductions or sequestration" as well as "clearly demonstrating that the abatement generated is additional to business as usual.".[63] Greenhouse Friendly 'carbon-neutral' accreditation requires the preparation of an independently verified, life cycle assessment, an emissions monitoring plan, annual reports, and use of Greenhouse Friendly approved carbon offsets.

The Gold Standard

The Gold Standard seeks to define the high-end, market for carbon credits arising from renewable energy and energy efficiency projects, and which also contribute significantly to sustainable development. The standard specifically excludes forestry or land use projects. The standard was an initiative of the World Wildlife Fund (WWF) and developed with a variety of other NGOs, businesses and governmental organizations, who believed that the Clean Development Mechanism did not adequately screen projects for their contribution to sustainable development. While the standard was originally created to supplement CDM projects, it now also certifies voluntary offset projects. The standard is in the midst of creating registry procedures for VERs to ensure that they cannot be sold multiple times.[64]

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[60] Climate Neutral Business Network. <http://www.climateneutral.com/>.

[61] Australia, Department of the Environment and Water Resources. *Greenhouse Friendly*. <http://www.greenhouse.gov.au/greenhousefriendly/> (accessed June 12, 2007).

[62] Australia, Department of the Environment and Water Resources. *Greenhouse Friendly Guidelines*. <http://www.greenhouse.gov.au/greenhousefriendly/publications/gf-guidelines.html> Updated October 23, 2006

[63] Australia, Department of the Environment and Water Resources. *Approving Abatement Projects*. <http://www.greenhouse.gov.au/greenhousefriendly/abatement/index.html> Updated May 11, 2007

[64] The Gold Standard. <http://www.cdmgoldstandard.org/how_does_it_work.php> (accessed May 7, 2006)

Plan Vivo

Plan Vivo is a standard specifically designed for community-based agro forestry projects, which describes itself as "a system for promoting sustainable livelihoods in rural communities, through the creation of verifiable carbon credits."[65] The system was created seven years ago by the Edinburgh Center for Carbon Management (ECCM) and is now managed by the non-profit organization BioClimate Research and Development (BR&D). Plan Vivo currently has three fully-operational projects in Mexico, Uganda, and Mozambique, which are producing carbon for the sale of Plan Vivo carbon offsets.[66] According to the organization's web site, The Plan Vivo system aims to ensure that its projects deliver: social benefits, biodiversity benefits, transparency, additionality foundations for permanence, an ethical option; and scientific and technical partnerships.

Social Carbon

The Social Carbon methodology and certification program was created by the Brazilian NGO Ecologica. The methodology is based on a sustainable livelihoods approach focused on improving "project effectiveness by using an integrated approach which values local communities, cares for peoples' potential and resources, and takes account for existing power relations and political context."[67] While it was originally created to assure "higher quality Kyoto Protocol carbon projects," the program methodology is now also used for voluntary market projects. The Social Carbon methodology has been used in hydrology, fuel switching, and forestry projects in Latin America and Portugal since 2000. Recently the program launched a connected certification program to verify project use of the methodologies and credits resulting from these projects.

New Standards

DEFRA's Code of Best Practice for (U.K.) Consumers & Voluntary Code of Best Practice on carbon offsetting

In early 2007, the United Kingdom's Department for Environment and Rural Affairs announced a plan to establish a Code of Best Practice "designed to give consumers clarity and confidence when they choose to offset."[68] A key feature of the plan is the suggestion to customers to only purchase Certified Emission Reductions (CERs), EU Allowances (EUAs), and Emission Reduction Units (ERUs) from the "robust and verifiable" regulated markets rather than VERs from the voluntary markets.[69] However, DEFRA recently announced including "high-quality Voluntary Emission Reductions (VERs) from the non-regulated market" is also under consideration.[70] The code also seeks to educate customers about offsetting as a means for climate change mitigation, bolster consumer confidence in the emission markets, encourage the UK's offset industry to develop standards consistent with Defra's consumer oriented code, and facilitate "the development of a robust and liquid global market infrastructure for carbon trading."[71] The Code was open for consultation through April 2007 and is now under review.

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[65] Plan Vivo: Carbon management and rural livelihoods. <http://www.planvivo.org>.

[66] Ibid.

[67] Social Carbon. <http://www.socialcarbon.com/>.

[68] DEFRA (Department for Enironment, Food and Rural Affairs). 2007. *Establishing a voluntary Code of Best Practice for the provision of carbon offsetting to UK customers*. January 18. <http://www.defra.gov.uk/corporate/consult/carbonoffsetting-cop/index.htm>.

[69] DEFRA. 2007. *Climate Change: Carbon Offsetting – Code of Best Practice*. January 18. http://www.defra.gov.uk/environment/climatechange/uk/carbonoffset/codeofpractice.htm Updated June 22.

[70] DEFRA. 2007. *News Release*. <http://www.defra.gov.uk/news/2007/070530a.htm> May 25.

[71] DEFRA. 2007 *Consulation on establishing a voluntary Code of Best Practice for the provision of Carbon Offsetting to UK customers* January 2007<http://www.defra.gov.uk/corporate/consult/carbonoffsetting-cop/consultation.pdf>.

In addition, and in collaboration with BSI British Standards, DEFRA recently announced that it will join forces with the Carbon Trust and BSI British Standards to create a standard means of "measuring embodied GHG emissions which can be applied across a wide range of product and service categories and their supply chains to enable companies to measure the GHG related impacts of their products and reduce them."[72] The overall objective is to establish a "single standard" that "will ensure a consistent and comparable approach to supply chain measurement of embodied GHGs across markets."[73]

European Carbon Investor Services (ECIS): Voluntary Carbon Offset Standard

In June, 2007, a group of more than 10 banks and financial institutions organized under the European Carbon Investor Services (ECIS) and including ABN Amro, Barclays Capital, Citigroup, Credit Suisse, Deutsche Bank and Morgan Stanley, announced they were creating a standard for carbon credits in the voluntary markets.[74] Imtiaz Ahmad, of MorganStanley and vice-president of the ECIS, described the standard as "a robust benchmark with environmental integrity in the voluntary market." The voluntary offset standard is aimed at brining "the voluntary market up to the level of the regulated and standardized procedures of the compliance market." The standard is broadly very similar to the CDM and JI, only it applies methodologies to an "eligible geographical area beyond those countries that have ratified the Kyoto protocol" and is focused largely on the United States and Australia's pre- compliance markets. Notably, it excluded carbon credits arising from the destruction of industrial gases such as HFC-23.

Green-e GHG Product Standard

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

VER + Standard

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

The Voluntary Carbon Standard (VCS)

Voluntary Carbon Standard's "Version 1 for Consultation" has been publicly available sine March 2006. However, the Climate Group, the International Emissions Trading Association (IETA) and the World Economic Forum plan to launch the final version of VCS sometime in 2007. The VCS aims "to provide a credible but simple set of criteria that will provide integrity to the voluntary carbon market and underpin the credible actions that already exist." [75] Mark Kenber, Policy Director at the Climate Group, described the

[72] DEFRA. 2007. *News Release*. <http://www.defra.gov.uk/news/2007/070530a.htm> May 25.

[73] Ibid.

[74] London, Fiona Harveyin. 2007. Banks take step toward carbon credit regulation. *Financial Times Limited* June 28 <http://www.ft.com/cms/s/c2bde6a4-2514-11dc-bf47-000b5df10621.html>.

[75] *The Voluntary Carbon Standard Verification Protocol and Criteria: Version 1 for Consultation. International Emissions Trading Association*. 2006. The Carbon Group and The World Economic Forum. 27 March, 2006.

standard as creating a basic "quality threshold" in the market. A goal for the VCS is for it to co-exist with other standards and "reinforce those that are robust and already exist (e.g. WBCSD/WRI GHG Protocol for Project Accounting, Gold Standard, and CCX). Credits certified via the VCS are then called Voluntary Carbon Units (VCUs).

Table 5. Major Certification Programs/ Standards Available or Soon to be Available for the US Voluntary Carbon Offset Market

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

For the Record: The Role of Registries

Besides standards, verification, and certification systems, there is another much-needed tool for the voluntary market: registries, which can keep track of credit ownership and eliminate "double-counting" or "double-selling." However, within the context of greenhouse gas emissions reductions, the term "registry" encompasses a range of definitions and ideas.

In general, there are two categories of registries: Those in the first category track greenhouse gas emissions and/or emissions reductions, while those in the second category are actually carbon credit accounting systems.

The United States' Department of Energy 1605 (b) Registry, the Canadian Greenhouse Gas Challenge, and World Economic Forum Global Greenhouse Gas registry all fall into the first category, while the Environmental Resources Trust GHG Registry and the Bank of New York Global Registrar and Custody Service fall into the second category. In some cases, the California Climate Action Registry. registries can effectively serve both roles.

For the purpose of this report, we are particularly focused on those registries that serve as credit accounting systems. However, in several cases, especially in the US, survey respondents cited using government-based emission/emission reductions registry programs as a means of publicly accounting for their project-based emission reductions and sequestration. Emission-reduction registries that account for project-based reductions include the US Department of Energy's 1605 (b) program, and the California Climate Action Registry. While these registries may not have been originally designed to account for carbon credit transactions, they have proved useful both as a way of acknowledging early actions and in creating systems for measuring project based emissions reductions. The role of the registries is summarized in Table 6.

Table 6: "Registry:" By Any Other Name..

	GHG Reduction Program	Entity Emissions Inventory	Entity Emissions Reductions Inventory	Project Emission Reductions Inventory	Carbon Credit Accounting	Market Exchange
CCX	✓	✓	✓	✓	✓	✓
WWF Climate Savers	✓					
Canadian GHG Challenge	✓	✓	✓			
ERT GHG Registry		✓	✓	✓	✓	✓
California Climate Action Registry		✓	✓	✓		
The Climate Registry		✓	✓	✓		
The Blue Registry					✓	
Carbon Disclosure Project		✓				
US DOE 1605 (b)		✓	✓	✓		

Credit Accounting Registers

Within the context of carbon credit accounting, there are a range a registries embodying varied characteristics. Registries studied for this report are initiatives in a variety of sectors, including government, non-profit, and private sector. Some are independent and others are associated with carbon credit sellers, standard programs, or verifiers. For example, the Chicago Climate Exchange registry was created to underpin the CCX cap

and trade exchange. The Bank of New York registry was created as accounting tool to ensure secure, private VCU transactions. Alternatively, ERT's GHG Registry has an emphasis on transparency, while the California Climate Action Registry was created primarily to give credit for early action in emissions reductions.

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

Asia Carbon Registry (ACR)

The Asia Carbon Group (ACG) developed the Asia Carbon Registry for VERs in 2007. ACG provides Carbon Advisory, Carbon Finance and Carbon Asset Management services under several different initiatives namely the ACX- Change and Asia Carbon Asset Development Facility. The Registry will accept a variety of protocols/ standard on the marketing including Gold standard, IETA's VCS, WRI-WBSCD and CCB. Registered VERs must also be third party verified. The scope of services include listing, transferring and retirement of VERs. The ACR will list the VERs electronically with a unique serial number and credits can only be retired by the registry.[76] While CERs have been traded on ACG's Asian Climate Exchange, it is unclear if VERs have been registered on the ACR.

The Bank of New York's Global Registry and Custody Service

The Bank of New York's custodial Registry was created in connection with the Voluntary Carbon Standard and aims to streamline and legitimize the trading process of the standard's Voluntary Carbon Units ("VCUs"). This centralized, electronic, and private accounting system stores VCUs, assigns each a unique serial number for tracking and verification purposes, and provides clear parameters for defining account ownership. The registrar requires certification under the Voluntary Carbon Standard and account information is not publicly disclosed. The registry is utilized by investors such Mitchell Feierstein at Cheyne Capital, who emphasizes the importance of registering their credits in "a credible global registry that provides a full scope of custodial services to investors, issuers and financial institutions. It is important that the registry be a creditworthy counterparty who may be financially accountable should the system ever break down. What we're talking about here is creation of a substantial new commoditized, fungible asset class in Voluntary Carbon Units. A custodial registry should ensure the security of these tangible assets."

BlueRegistry

TÜV SÜD, a company that validates and verifies both Kyoto and voluntary emission credits, recently announced BlueRegistry, a database of certified VERs and renewable energy credits. Initially, the database will be exclusive to VERs certified by TÜV SÜD. However, TÜV SÜD aims for the registry to become a "master" registry for voluntary carbon credits, including CCX CFIs and Voluntary Carbon Standard VCUs. The BlueRegistry is designed to be transparent, and will have publicly available information on factors such as credit-type, credit ownership and vintage.

The California Climate Action Registry

The California Climate Action Registry was established by California law as a non-profit voluntary registry for greenhouse gas (GHG) emissions with a view to protecting and rewarding any early action companies might take in reducing greenhouse gas emissions. The idea for the registry started at the grassroots (or, if you prefer, at the point source) when a few companies in California went to the state government in 2000 saying they wanted to reduce their carbon emissions, but needed assurances from the state that their actions would not harm them down the line if a climate regulatory regime was established. Diane Wittenberg, the Registry's President, puts it rather simply: "We are," she says, "a voluntary but rigorous registry that can help companies and others establish greenhouse gas emissions baselines against which any future reduction requirements may be

[76] The Asia Carbon Group. 2007. Asia Carbon Group launches VERs Registry and Projects Monitoring Services at Carbon Expo 2007. <http://www.asiacarbon.com/news_archive/Press_Relase7.htm>. May 11.

applied." As of July, 2007 the CCAR had some 273 members ranging from businesses, industries, cities, universities, non-profits, and government agencies.

In addition to emissions reporting, the registry is about to initiate a credit accounting system linked to its certification and protocols. CCAR currently has approved protocols for livestock methane and forest activities and will soon release a natural gas transmission and distribution reporting and certification protocol.[77]

The Chicago Climate Exchange Registry

The Chicago Climate Exchange registry was created as an accounting system for the CCX cap-and-trade program. Inclusion in the Chicago Climate Exchange's (CCX) registry requires membership in its voluntary yet legally binding cap-and-trade system. Because the CCX system trades both emissions reduction allowances and project based offset credits, the registry is both an emission reductions tracking program and carbon credit (in this case referred to as Carbon Financial Instruments) accounting system.[78] The registry is somewhat transparent, providing information regarding the offset provider/aggregator and project type and location. The CCX Committee on Offsets approves projects submitted by offset providers/aggregators and assigns serial numbers to ensuing third party verified credits.

Environmental Resources Trust GHG Registry Program

Environmental Resources Trust (ERT) recently announced the creation of a new registry for the voluntary carbon markets. ERT claims its registry will facilitate the development of a credible and publicly transparent market that records and tracks "qualified emissions reductions."[79] Serialization numbers are attached to traceable "project-specific reductions" equivalent to a metric ton of CO_2.[80] Serving as the "system administrator," ERT opens customer accounts, develops protocol for emission reduction claims via reviewed of emission baselines, stated reduction commitments, and the subsequent results that translate into saleable credits.[81] The ERT registry provides third-party validation and verification services with standards varying on a case by case basis. ERT seeks to attract varying market participants to "establish accounts with ERT for the purpose of registering tonnes either for sale, banking, or secure retirement."[82]

Triodos Climate Clearing House

Triodos Climate Clearing House is a project of Triodos Bank, a European based bank focused on financing "enterprises which add social, environmental and cultural value" It claims to transact "CO_2 credits in a transparent, accountable and efficient manner."[83] The organization does not explicitly state a requisite for third party verification or certification, but it does state that qualified projects include activities involving "afforestation, renewable energy and energy efficiency" and was created, in part, to assure that credits cannot be double counted.[84] Account holders include the Carbon Neutral Group and the Dutch Face Foundation.

Retailer or Certification Program Registries

While the registries discussed above, with the exception of Bank of New York, are all open to a variety of credits, it is important to note that several certification programs and retailers have created their own registries. For example, the Gold Standard is in the midst

[77] The Climate Registry. 2007. Protocols in Progress. <http://www.climateregistry.org/PROTOCOLS/PIP/>.

[78] CCX (Chicago Climate Exchange). How it Works <http://www.chicagoclimateexchange.com/trading/howItWorks.html>.

[79] ERT (Environmental Resources Trust). GHG Registry Program <http://www.ert.net/ghg/full.html>.
[80] Ibid.
[81] Ibid.
[82] Ibid.
[83] Triodos Bank. Triodos Climate Clearing House. <http://www.triodos.com/com/climate/?lang=>.

[84] Ibid.

of creating a registry for their voluntary credits. Likewise, organizations such as the Carbon Neutral Company have created and posted partially transparent registries as an accounting tool for managing their own credits and "to underpin the integrity and transparency of our carbon offsetting programs."[85]

Regulatory Registries & Credit Accounting Systems

In addition to referencing these government programs, it is important to note that in numerous cases sellers of credits into the voluntary markets are utilizing credits from the Clean Development Mechanism, Joint Implementation or the New South Wales Greenhouse Gas Abatement scheme. Hence, these regulatory driven registries also have linkages to the voluntary markets.

Table 7: A Comparison of Carbon Credit Accounting Registries in the Voluntary Carbon Markets

	Bank of New York	Environmental Resources Trust	Blue Registry	CCX Registry	Triodos Climate Clearing House	California Climate Action Registry	Asia Carbon Registry
Serial Numbers	Yes	Yes	Yes	Yes	Unknown	Yes	Yes
Standard/ Verification Requirements	Voluntary Carbon Standard	ERT Approved	VER+ Standard, Plans to incorporate other standards	CCX Board Approved;	Unknown	CCAR Protocols	Approved standards available on the market
Transparency	Accepted standards public; Account information not disclosed	Standards used unclear; Account information public	Accepted standards public; Account information public	Uses CCX Standards; Exchange data public; Account information not disclosed	Standards unclear; Account information not disclosed	Accepted standards public; Account information public	Accepted standards public; Unclear if account information public
Start Date	2006	1997	Expected launch mid-2007	2003	2001	Reduction Registry running. certified credit registry 2007	2007
Total Credits Registered	Unknown	345,346,812t; of which 17,173,624 offset credits	Upcoming Registry	345,356,812t Registered, of which 12,865,500t offset credits	2,033,707t offset credits	2001 emissions reductions registered; registered credits upcoming	Upcoming

Because the V (in VER) is for Verification

The same part of the questionnaire also asked for details on the type of verification processes used in 2006. The results from 40 organizations with combined 2006 sales of 9Mt are shown in Figure 17 illustrates the overwhelming use of third party verifiers rather than the customer's and seller's own verification procedures. The situation is clearly linked to the quality issues highlighted elsewhere in this report and the need for independent scrutiny of the projects generating the offsets.

[85] The CarbonNeutral Company. Offset Project Registry. <http://www.carbonneutral.com/pages/Offsetprojectregistry.asp>.

Figure 17 Type of verification process used in 2006

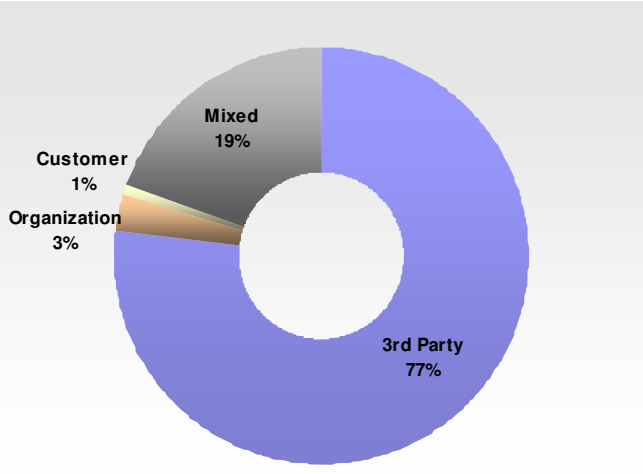
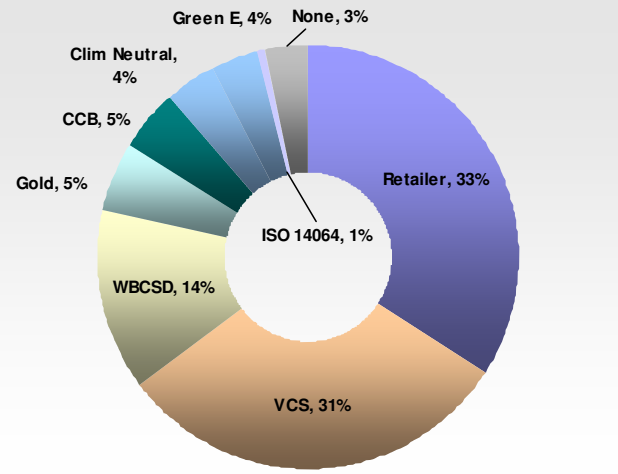


Figure 18 Preferred Standard/Certification Procedures



Standards and Certification Procedures

Respondents on the seller survey were asked about their preference for using certain standards and certification processes. The results as shown in Figure 18 were taken from 36 organizations totaling 6.0Mt or 60% of recorded transaction volume in 2006. Note that some responses indicated that Australian Greenhouse Friendly Scheme was used as standard / certification in 2006. The responses received show that retailer specific standards, representing 33% of the market, were the most used type of standard. The next most popular was the VCS at 31% followed by the WBCSD representing 14% respondents.

As well as current standards, we also asked respondents which future standards they consider to be the most appropriate for their needs. 38% of respondents cited interest in the Voluntary Carbon Standard (VCS), 20% cited interest in the Voluntary Gold Standard, and 12% of respondents noted particular interest in CCB standards. The remaining 30% cited Green- e standards, ISO 14064, Social Carbon and VER+ as possible future standards of interest. Many indicated that they are currently evaluating all upcoming standards and will adopt a suitable standard at a later date.

Standards are clearly important issues for the industry and a number of respondents indicated concern over the availability of appropriate standards. However, because standards are so new and evolving so quickly we noticed some level of confusion around responses to this question.

To supplement these survey responses, we also interviewed standard organizations and certification systems providers to gain further insights into how many projects or credits had been verified through the program. Since the range of standards/ certification systems have been created to fit in at different levels in the supply chain, a “one-size answer” did not fit all. Table 8 shows the current status of voluntary standards and certification systems.

Table 8: Current Status of Standards and Certification Systems

	Current Status
CCB Standard	Two projects certified to CCB standards. There are currently 24 projects in the pipeline to receive CCB approval.
Greenhouse Friendly	Some 4 million VERs have been certified by Greenhouse Friendly.
Plan Vivo	Three fully operational projects are producing VERs under the Plan Vivo scheme.
Social Carbon	Ten projects representing 350,000 tonnes of VERs and 150,000 tonnes of CERs have been certified with the Social Carbon methodology. Some 29 projects are the pipeline to reviewed.
Voluntary Gold Standard	Six projects have been validated under the VGS scheme resulting in 170,000 of VERs issued and 72,000 CERs issued. There are currently over 85 projects in the pipeline to be reviewed.

The Use of Registries

Because of the importance of registries for voluntary offset accounting (and because they make the process of tracking the voluntary offset market much simpler), we also asked respondents about their current use of registries. Overall we found that registries are several steps behind standards as priorities for the voluntary offset markets. In summary, out of a total of 64 suppliers that completed the section, 25% indicated that holding credits in a registry was not applicable to them.

Of the 48 organizations that indicated that their credits were listed in a registry, 21% of suppliers indicated they were listed under their organization's own specific registry. Reponses for example indicated that credits listed in organizations' own registries were in some cases third party audited and in others unaudited. This is the most popular holding account for VERs with the CDM/JI registry being the next most used but only representing 15% of respondents listing their credits ina registry. The fact that most suppliers cite use of their own, rather than an independent registry is most likely because very few independent credit accounting registries were in existence in 2006. Currently, there are still a limited number of options for suppliers seeking an independent registry, not just for emissions reductions but also for verified credits.

Several other organizations selling credits into the OTC market indicated that credits were listed on the Chicago Climate Exchange and under the Clean Development Mechanism. The remaining organizations indicated their credits were listed under the Environmental Resources Trust, Bank of New York (VCS registry), CDM Gold standard and California Climate Action Registry. Other registries most frequently mentioned were national, state, and Kyoto registries.

Some organizations indicated that all credits were listed in one particular registry, while others indicated that credits were split between different registries for different projects.

8. Why buy offsets?

Customers

After all is said and done, and beyond all talk of registries, standards, and project types, the voluntary markets are ultimately driven by consumers voluntarily offsetting their emissions in the OTC market. But every consumer is different, and each has his or her own reasons for participating in this market. In order to better understand the source for demand in this market, we asked our survey participants to tell us a bit about their customers. The figures below summarize these results.

Since we surveyed suppliers throughout the value chain, these figures include entities trading between players in the voluntary market and not just those retiring credits. The 41 suppliers that responded to this question in the survey classified their customers in 2006 as 80% private businesses, with 12% being government, 5% individuals and 2% NGO. Over half of customers cited were based in the United States (68%) with Europe coming in second (28%) with Canada (%3) as a distant third.

Figure 19: Type of Credit Buyers by Volume

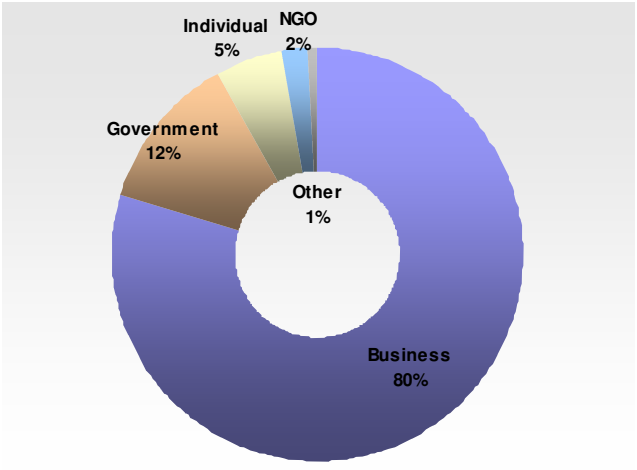
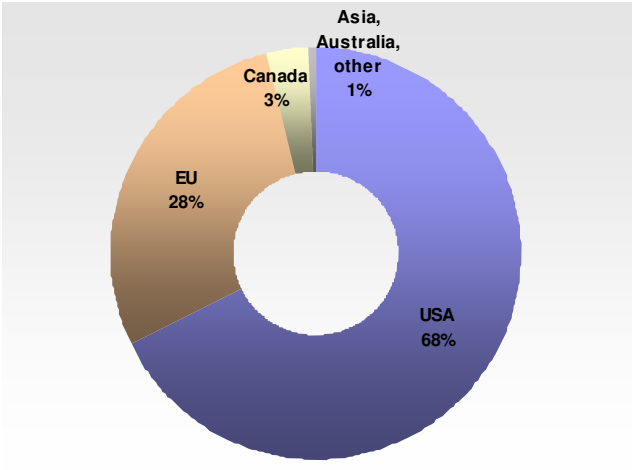


Figure 20: Customer Location



The Driving Force: Customer Motivations

If we are to truly understand the driving forces behind the voluntary market, we need to understand why buyers buy. In order to do this, we asked final buyers and suppliers to rank (from 1-5) a series of purchasing motivations based on their own goals and perceived customer goals. The proposed motivations were:

- Sustainability reporting/internal goals
- Corporate responsibility/environmental ethics
- Public relations/branding
- Sales of carbon-neutral products
- Anticipation of regulation
- "Walking the talk"
- Climate change influences business model (For example, re- insurance agencies)
- Other

In general, and explained earlier, we focused on surveying suppliers for this report. The results are shown in Figure 21. Table 9 shows the responses by stage of value chain.

Because of the importance of their opinion, final buyers' responses are cited in this section.[86]

From a sellers perspective, the two most prominent reasons for buying carbon offsets were for general CSR purposes and being seen to "walk the talk." Interestingly, relatively few respondents saw the main benefit of acquiring carbon offsets through the voluntary market as a means to achieving future regulatory compliance, which is the reason many people give for the very existence of the voluntary market. This might indicate that, even in the face of future regulation, the voluntary carbon market may continue to grow and thrive. Specifically noted "other" reasons outside of those listed included "director level support" and "taking the initiative in this field."

Figure 21: Why Buyers Buy Offsets (supplier responses)

Table 9: Why Buyers Buy Offsets (supplier responses)

	Sust. Reporting	Corp Resp.	PR / branding	Sales of products	Anticipation of Regulation	"walk the walk"	Business Model
Developer	3.9	4.1	4.1	3.0	3.1	3.8	3.1
Wholesaler	3.0	3.5	3.5	2.0	2.5	3.0	4.5
Retailer	3.8	3.9	3.8	3.3	2.8	3.8	3.5
Broker	4.5	4.0	3.5	2.0	1.5	3.0	2.8
Overall:	**3.8**	**3.9**	**3.8**	**3.1**	**2.8**	**3.6**	**3.3**

While the final buyer responses are particularly pertinent, the supplier projects are more statistically significant. In total 59 suppliers filled out this survey. Different organization types perceived roughly similar customer motivations across categories, with largest variation in opinion coming on the response "sustainable reporting." However, like the responses we received from final buyers, suppliers in the market ranked anticipation of

[86] The buyers part of the survey initiated responses from 14 organizations. Although this is a lower response rate compared to the supply side survey the coverage was broad including two financial institutions, two manufacturing companies, one government department, one conference company and nine 'other' organizations. These other organizations included non-profit foundations, policy research institutions, individuals, offset certifiers and oil & gas companies. The low response rate means that the results from this side of the survey are less statistically significant that the seller survey. Nonetheless taken on aggregate they do illustrate some of the general trends seen in the buy side of the market.

regulation as the least motivating factor. The perception among suppliers, in other words, is that few buyers are using the OTC voluntary market to prepare for regulation, even in the United States. This goes counter to many arguments for the existence of voluntary markets that are commonly touted in carbon circles. It might also mean that, in the United States and other countries without carbon regulation, major emitters of GHGs who expect to face impending regulation do not see the voluntary OTC markets as a means of preparation for that regulation. Such emitters, as is the case with American Electric Power (AEP) in the US are likely reducing their own emissions directly and registering these emissions reductions on government-backed registries. In the US case, some of these emitters (again, AEP is a case in point) are members of large-scale voluntary initiatives such as the CCX.

Since actors at different levels of the value chain may have different types of customers, we wanted to see if there might be some differentiation in the response to this question by sector. However, in general the rankings were fairly similar. Most ratings varied little across the different types of suppliers. The largest variation of perception of customer motivations was under rubric of desire to "Walk the Talk." Wholesalers thought their customers were particularly motivated by the perception that climate change would influence their business model, while brokers attributed action mostly to the need for better sustainability reporting. Developers, meanwhile, seemed to believe that the main motivation for action was the desire for PR/branding and to comply with standards of corporate social responsibility.

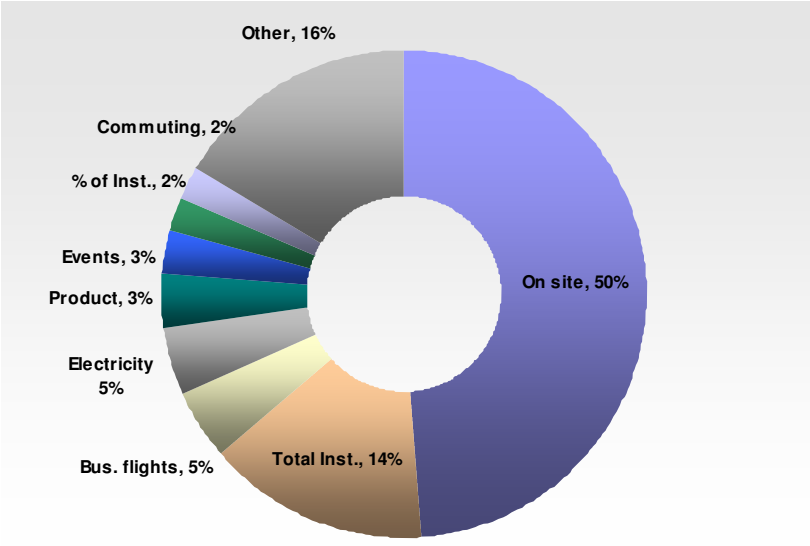
Type of Emissions Offset

Respondents were also asked to describe the type of emissions that they/ their customers had offset or are considering offsetting. The options were:

- Total institutional emissions
- A set percent of institutional emissions
- On site emissions from industrial activities or energy production
- Business related flights
- Commuting/ vehicle use
- Events
- Electricity use
- Product life cycle emissions
- Other

For both sets of respondents, the majority of emissions offset were a proportion or total of institutional emissions. Just under half (40%) of final buyers noted they purchased carbon credits to offset total organizational emissions. Suppliers responded that 64% of VERs sold were aimed at offsetting institutional (including onsite) emissions (see Figure 22). In both cases business flights were a source of emissions offset, whereas final buyers and suppliers noted respectively 5% and 15% of VERs used to offset these types of emissions. One major differentiating factor is that final buyers in aggregate noted 15% of VERs offsetting "product life cycle emissions" for carbon neutral products, while suppliers thought only 3% of VERs sold were being used for this purpose. This discrepancy is possibly due to the very low number of final buyer respondents and the fact that one major respondent is a seller of a carbon neutral product.

Figure 22: Type of Emissions Offset (supplier responses)



Weighing the Options – A Flight to Quality

As discussed in Section 5, better defining quality in the offset market has been, and will likely continue to be, the single most controversial point of contention within voluntary carbon markets. However, there has been little information provided about how buyers weigh different decision criteria when voluntarily purchasing carbon credits. In response to this gap, we interviewed a range of buyers about criteria used when purchasing offsets. Our goal was to use responses to help us design an appropriate survey question. Both suppliers (except project developers) and buyers were asked to rank key criteria when sourcing VERs. The options were:

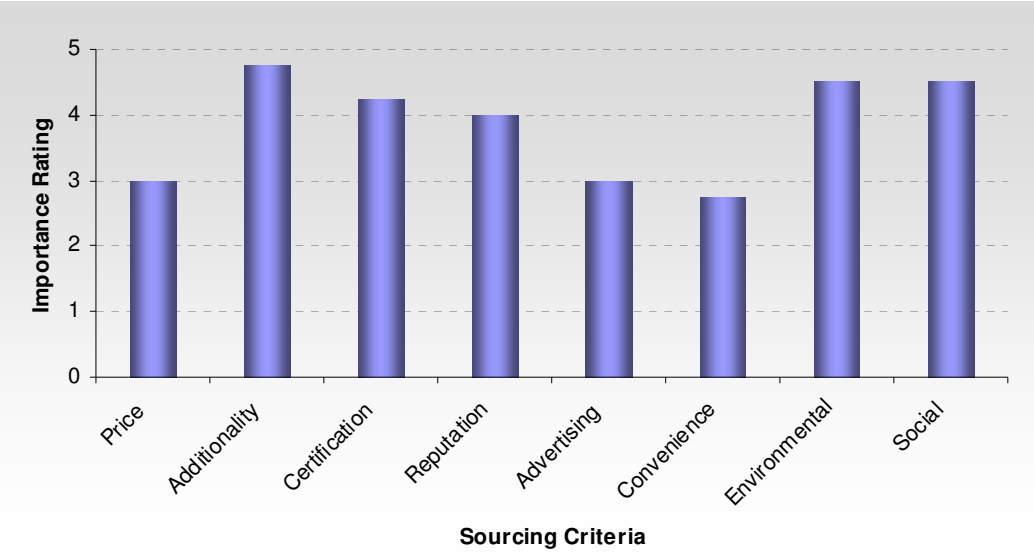
- Price
- Additionality assurance
- Specific certification
- Reputation of seller/project
- Seller advertising/communications
- Convenience
- Environmental co-benefits
- Social co-benefits
- Other

Although price is important, it ranks behind "additionality" (the demonstrable ability to reduce emissions beyond the levels that would otherwise have occurred) and general environmental benefits. The other factors covered a range of attributes including:

- The need to have the credits independently verified
- The ability to select certain types of projects
- The location of projects and providers
- The quality of information provided by providers
- Gold standard certified CDM registered offsets
- Transparent accounting and reporting procedures
- Monitoring and verification assurances
- Insurance against risk of project under-performance

Respondents also indicated that additional factors influencing their purchasing decision were: supply limitations for locally-based offsets, how the credits will be registered and retired upon sale, alignment of offset project with organizational mission and philosophy, and abatement providers' ethical standards.

Figure 23: What Buyers Look for When Buying Offsets (seller responses)



These responses indicate a complex range of attributes that buyers look for in acquiring project based carbon offsets. The general trend, however, indicates that quality has become central to players in this market. Most participants highlight quality in one or another form (in terms of additionality, general environmental benefit, information provision and transparency in all aspects of the project development cycle, quality assurance processes etc) as the issue of most importance to buyers, more important even than price.

9. Over the Horizon: A Rising Market Demand

Whilst the purpose of this report has been on 2006 market activity, the urge to report on this year's transactions has been strong: 2006 may have been the year the voluntary carbon markets hit the mainstream public consciousness, but 2007 has already seen a substantial increase in volume compared to 2006.

Taking a quick look at the first half of 2007, the Chicago Climate Exchange reported that, after six months of trading, it had already traded 11.8 $MtCO_2e$ - more than had been traded in the entire year of 2006. If that pattern continues, the CCX is well on its way to trading more than 20 million tonnes of carbon this year.

The OTC voluntary market is also showing similar signs of growth. Some of the respondents in our survey reported that in 2007 they had seen a doubling or a tripling of volumes transacted in these markets. One respondent reported a 1000% growth in their transactions in the first six months of 2007 as compared to the entire year of 2006. However, any growth rates of this need to be tempered by the fact that many players in the market are starting from small beginnings. Adding together the numbers provided by respondents on transactions in 2007, we are already showing trades of more than 15 million tonnes of CO_2e in the OTC voluntary carbon markets. Again, if this trends bears out, we could easily see a doubling of reported market volumes in the OTC market this year.

Additionally, there have been several requests for proposals for voluntary carbon that add up to considerable volumes. For example, the largest publicly-owned utility in the US, Pacific Gas & Electric (PG&E) recently launched, in California, its "ClimateSmart" program, whereby its customers are given an opportunity to voluntarily offset their carbon emissions directly via their utility bills. To kick-start the program, PG&E has offset its own emissions using some $1.4 million of its own shareholders money. Estimates are that, if the program functions as expected, it could generate demand for some 2 million tonnes of carbon per year. Already, the utility has put out a public RFP seeking 250,000 tonnes of carbon from the voluntary carbon markets.

This could be the tip of the iceberg. Like PG&E, the number of companies and individuals who have decided to go "carbon neutral" seems to get bigger each day. Already Dell, Delta, AEP, Google, Yahoo, Nike, Sky, Origin Energy, and various other major consumer-facing organizations have announced that they will be buying (possibly hundreds of thousands) of tonnes of carbon offsets from the voluntary markets. Then there are the more than 280 colleges and universities across the US that have pledged to go carbon neutral, and the dozens of cities that have done the same. While, of course, much of these goals will and should be achieved through direct emissions reductions, in many cases companies will also use offset credits to meet their goals. As explained by Google's Senior Vice- President of Operations, Urs Hoelzle, "In order to meet our short-term goal of carbon neutrality, we have decided to purchase some carbon offsets. To be clear, we see carbon offsets not as a permanent solution but rather as a temporary tool which allows us to take full responsibility for our impact right away."[87]

Put all this empirical and anecdotal data together and we see that the first half of 2007 has already traded, in just six months more than our total estimated number of transactions for all of 2006. Based on this evidence to date we expect that traded volumes in 2007 could well be twice as high as in 2006.

And having surveyed 45 market participants as to their perceptions for growth in the market, it would appear that they agree with this assessment (see Table 10). When asked for the projected size of the voluntary carbon markets 2, 3, and 5 years into the future, the average estimate of those surveyed predicted that this market would increase 143% in

[87] The Official Google Blog.Carbon Neutrality by end of 2007. <http://googleblog.blogspot.com/2007/06/carbon-neutrality-by-end-of-2007.html>. June 19.

2007. This figure however includes some rather extreme predictions. The table therefore shows the mean excluding 5 particular extreme predictions as well as the median growth rate forecast. On average the survey respondents expected growth rates to decrease as the market matures - 90% in 2009, 60-70% in 2010 and 2011, but then rising again to 80% in 2012. This translates to estimated annual transactions (including all intermediary trades) of between 380Mt/yr and 1bnt/yr by 2012 depending on whether the simple average, adjusted average or median growth rates are assumed.

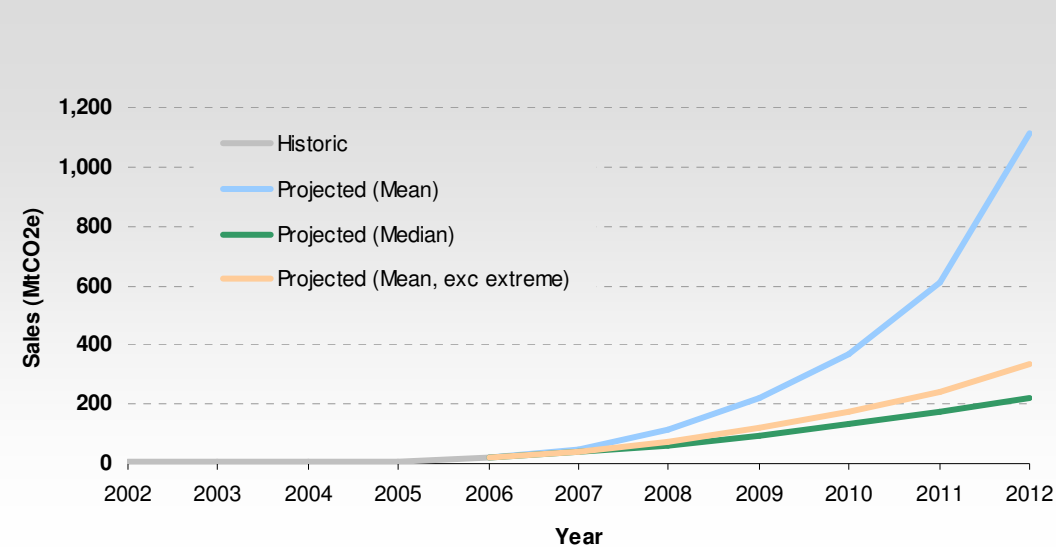
Clearly, this is not an unbiased (or disinterested) survey sample, but what it does tell us is that the market participants are bullish. They appear to believe that, within the next five years, this market could become as big as the current market for CDM credits.

Table 10: Average market growth rates (seller responses)

	2007	2008	2009	2010	2011	2012
Mean	143%	135%	90%	67%	65%	83%
Mean (exc. 5 extremes)	94%	88%	60%	47%	40%	37%
Median	100%	50%	50%	50%	28%	25%

But whatever happens in this market, judging from the past, it is likely to be interesting and to serve as a bellwether for both public opinion towards climate change and carbon trading as a whole. For that reason, we intend to continue to produce yearly analyses of these markets and to provide these to the markets as a way of gauging, not only the past, but perhaps even the future. We hope you find these annual surveys interesting and useful, and perhaps even more importantly, we hope that you will help provide us with the information we need to make sense of this difficult –but fascinating—market.

Figure 24: Future Market Size Estimate (average of seller responses)



Appendix 1. Survey Participants

Name	Organization Type	Project Type	Website Address
Native Energy, LLC	Retailer, Wholesaler/Aggregator	Avoided deforestation /management, Methane: livestock, landfill, Renewable energy credits (RECs)	http://www.nativeenergy.com/
cleanairpass	Retailer	Afforestation/reforestation mix native, Methane: livestock	https://www.cleanairpass.com/cap/home.jsf
TreeBanking Inc.	Retailer	Afforestation/Reforestation	http://www.treebankinginc.com/Home/tabid/37/ctl/Privacy/Default.aspx
DriveNeutral	Retailer	Mixed/ Not specified	http://www.driveneutral.org/
Robinsong Ecological Resources, Inc.	Retailer, Wholesaler/Aggregator, Broker	Unknown	http://www.robinsong.com/
Cred Ltd.	Retailer, Wholesaler/Aggregator, Broker, Project Developer	N/A	http://www.cred.ltd.uk/home
South Pole Carbon Asset Management	Wholesaler/Aggregator, Project Developer	Methane: coal mines, Energy efficiency	http://www.southpolecarbon.com/
Climate Wedge Ltd Oy	Wholesaler/Aggregator	N/A	http://www.climatewedge.com/
Woodland Trust	Retailer	Afforestation/reforestation mix native	http://www.woodland-trust.org.uk/
The CarbonNeutral Company	Retailer	Afforestation/reforestation plantation, Afforestation /reforestation mix native, Methane: livestock, coal mines, Energy efficiency, Off grid renewable energy, Mixed/ Not specified	http://www.carbonneutral.com/
Emergent Ventures India	Broker	Afforestation/reforestation plantation, Methane: livestock, Energy efficiency, Off grid renewable energy	http://emergent-ventures.com/
Greenhouse Balanced	Wholesaler/Aggregator	Afforestation/reforestation mix native	http://www.greenhousebalanced.com/
3C Group	Broker	Afforestation/reforestation plantation. Energy efficiency, Off grid renewable energy	http://www.3c-company.com/en/
Ducks Unlimited, Inc	Project Developer	Afforestation/Reforestation/ Land Use	http://www.ducks.org/
SKG SANGHA	Project Developer	Avoided Deforestation/ management, Methane: livestock	http://www.skgsangha.org
Action Carbone	Retailer	Afforestation/reforestation mix native, Methane: coal mines, Energy efficiency, Renewable energy credits (RECs)	http://www.actioncarbone.org/main_fr.php
Ambiental PV Ltda.	Project Developer, Other: Project Verifier	N/A	http://www.ambientalpv.com/base.swf
Southern Metropolitan Regional Council	Project Developer	Unknown	http://www.smrc.com.au/
Genesis Analytics	Project Developer, Other: Economic Development Consultants	Unknown	http://www.genesis-analytics.com/
Prima Klima -weltweit- e.V.	Retailer, Other: fund raising and working with project developers	Afforestation/reforestation mix native	http://www.prima-klima-weltweit.de/
Carbon Footprint Ltd	Retailer	Unknown	http://www.carbonfootprint.com/
Climate Neutral Group	Retailer,	Afforestation/reforestation	http://www.climateneutralgrou

	Wholesaler/Aggregator, Project Developer	plantation, Afforestation/ reforestation mix native, Avoided deforestation/ management, Energy efficiency, Off grid renewable energy	p.com/
Climat Mundi	Retailer, Wholesaler/Aggregator, Broker, Project Developer	Avoided Deforestation/management, Methane: landfill	http://www.climatmundi.fr/lng_EN_srub_3-Home.html
Climate Trust/ Mercy Trust	Retailer, Wholesaler/ Aggregator, Project Developer	Energy efficiency, Mixed/ Not Specified: Reduced fuel usage	http://www.climatetrust.org/
Carbon Planet	Retailer, Broker	Unknown	http://www.carbonplanet.com/home/
MGM International	Wholesaler/Aggregator, Project Developer	N/A	http://www.mgminter.com/
CoolClimate LLC (AtmosClear)	Retailer, Wholesaler/Aggregator, Broker	Methane: landfill	http://www.atmosclear.org/index.html
Climate Stewards	Retailer, Project Developer	Afforestation/reforestation mix native	http://www.climatestewards.org.uk
Blue Source, LLC	Wholesaler/Aggregator, Project Developer	Methane: coal mines, Mixed/ Not specified	http://www.ghgworks.com/
CO2OL-USA	Retailer, Project Developer	Afforestation/reforestation plantation, Afforestation/ reforestation mix native,	http://www.co2ol-usa.com/
Uncook the Planet	Retailer, Broker, Project Developer	Energy efficiency	http://www.seao2.com/
Love Trees	Retailer, Wholesaler/Aggregator, Broker, Project Developer	N/A	http://www.lovetrees.ca/
DrivingGreen.com	Retailer	Methane: livestock	http://www.drivinggreen.com/
Offsetters Climate Neutral Society	Retailer, Broker Project Developer	Avoided Deforestation/ management, Energy efficiency, Off grid renewable energy	http://www.offsetters.com/
Cill Ide Native Plant Nursery	Retailer	Afforestation/reforestation mix native,	http://stores.wetlandplantnursery.com/StoreFront.bok
The Trust for Public Land	Project Developer	Afforestation/reforestation mix native,	http://www.tpl.org/
CO2 Australia Limited	Retailer, Wholesaler/Aggregator, Project Developer	Afforestation/reforestation mix native	http://co2australia.com.au/
BioClimate Research & Development	Project Developer	Afforestation/reforestation mix native	http://www.planvivo.org/
Clean Air Action Corp	Project Developer	Unknown	http://www.cleanairaction.com/
Environmental-Synergy	Project Developer	Afforestation/reforestation mix native	http://www.environmental-synergy.com/flash.html
Carbon Clear Ltd	Retailer, Wholesaler/Aggregator, Project Developer	Unknown	http://www.applegate.co.uk/company/13/85/130.htm
Bonneville Environmental Foundation	Retailer, Wholesaler/Aggregator, Broker, Project Developer	Renewable energy credits (RECs)	http://www.b-e-f.org/
CantorCO2e	Broker	Renewable energy credits (RECs)	http://www.cantorco2e.com/
Climate Care	Retailer, Project Developer	Energy Efficiency	http://www.climatecare.org/
Uganda Carbon Bureau	Retailer, Broker, Project Developer	N/A	
Conservation International	Wholesaler/Aggregator, Project Developer	Afforestation/reforestation mix native. Avoided	http://www.conservation.org/xp/CIWEB/

		Deforestation/management,	
CARE International	Project Developer	N/A	http://www.careinternational.org/
Carbonfund.org Foundation	Retailer, Wholesaler/Aggregator, Broker, Project Developer	Unknown	http://www.carbonfund.org/site/
Reliance Energy Ltd	Project Developer	Industrial gas, Energy efficiency, Renewable energy credits (RECs)	http://www.rel.co.in/
New Forests	Wholesaler/Aggregator, Project Developer	Afforestation/Reforestation/ Avoided Deforestation	http://www.newforests.com.au/
ERA Ecosystem Restoration Associates Inc.	Retailer, Project Developer	Afforestation/reforestation mix native,	http://www.econeutral.com/
Renewable Energy and Energy Efficiency Partnership (REEEP)	Broker	Off grid renewable energy	http://www.reeep.org/
Scarborough Fair Carbon	Broker	N/A	http://www.interludeshotel.co.uk/faircarbon.html
The Conservation Fund	Project Developer; Retailer	Afforestation/Reforestation	http://www.conservationfund.org/
Bosque Sustentable, A.C.	Project Developer	Afforestation/reforestation plantation,	http://www.sierragordamexico.org/en/bosque_sustentable/background.html
Treeflights.com	Retailer	Afforestation/reforestation mix native	http://www.treeflights.com/
The Nature Conservancy	Project Developer	Afforestation/reforestation plantation, Avoided Deforestation/management,	http://www.nature.org/
Sterling Planet, Inc.	Retailer	Afforestation/reforestation mix native, Energy efficiency, Renewable energy credits (RECs)	http://www.sterlingplanet.com/
The Pacific Forest Trust	Retailer, Project Developer	Avoided Deforestation/management,	http://www.pacificforest.org
Terrapass Inc.	Retailer	Methane: livestock, landfill, Renewable energy credits (RECs)	http://www.terrapass.com/