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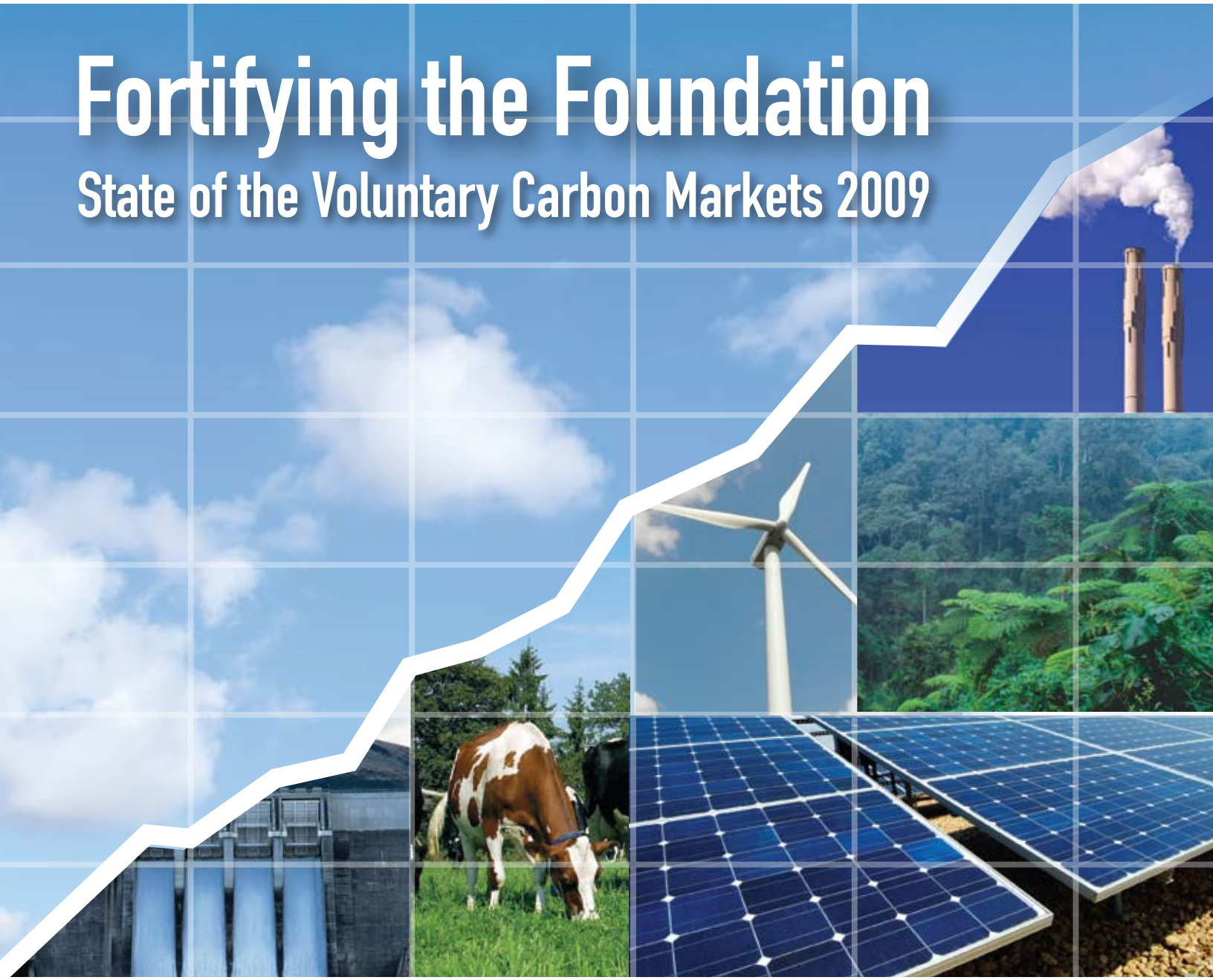
Fortifying the Foundation

State of the Voluntary Carbon Markets 2009



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State of the Voluntary Carbon Markets 2009

A Report by Ecosystem Marketplace & New Carbon Finance

Katherine Hamilton, Milo Sjardin, Allison Shapiro,
and Thomas Marcello

20 May, 2009

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About Ecosystem Marketplace and New Carbon Finance

Ecosystem Marketplace, a project of the non-profit organization Forest Trends, is a leading source of information on environmental markets and payments for ecosystem services. Our publicly available information sources include annual reports, quantitative market tracking, weekly articles, daily news, and newsletters designed for different payments for environmental services stakeholders. We believe that by providing solid and trustworthy information on prices, regulation, science, and other market-relevant issues, we can help payments for ecosystem services and incentives for reducing pollution become a fundamental part of our economic and environmental systems, helping make the priceless valuable.

Ecosystem Marketplace's work on the voluntary carbon markets is financially supported by the United Nations Foundation, the Surdna Foundation, the United Kingdom's Department for International Development, and the Blue Moon Fund.

New Carbon Finance is the leading provider of information, analysis, and insights into the North American, European, and global carbon markets. New Carbon Finance constantly strives to provide the most accurate projections of future carbon market prices, using proprietary fundamental analysis and models. The research underlying this report provides a crucial quantitative platform that will substantially enhance the understanding of the fast-moving voluntary carbon market.

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 130 full-time staff and with permanent research bases in the U.K., U.S., China, South Africa, Brazil, India and Australia, as well as a wide range of associates and contact networks.

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Glossary

AAU	Assigned Amount Units
AB 32	Assembly Bill 32: California's Global Warming Solutions Act
ACG	Asia Carbon Group
ACR	American Carbon Registry
ACX	Australian Climate Exchange
ACX	Asia Carbon Exchange
AES	AES Corporation
BoNY	Bank of New York Mellon
CAR	Climate Action Reserve (Also known as The Reserve)
CARB	California Air Resources Board
CCAR	California Climate Action Registry
CCB	Climate, Community, and Biodiversity Standards
CCBA	Climate, Community, and Biodiversity Alliance
CCFE	Chicago Climate Futures Exchange
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFC	Chlorofluorocarbon
CFI	Carbon Financial Instrument (unit of exchange on CCX)
CFS	CarbonFix Standard
CFTC	Commodities Futures Trading Commission
CO_2	Carbon dioxide
CPRS	Carbon Pollution Reduction Scheme (Australia)
CRT	Climate Reserve Ton
ECCM	Edinburgh Center for Carbon Management
ECIS	European Carbon Investor Services
ECX	European Climate Exchange
EPA	U.S. Environmental Protection Agency
EPA CL	U.S. Environmental Protection Agency Climate Leaders
ERT	Environmental Resources Trust
ETS	Emissions Trading Scheme
EUA	European Union Allowance
EU ETS	European Union Emission Trading Scheme
ERU	Emission Reduction Unit
FINRA	Financial Industry Regulatory Authority
FTC	U.S. Federal Trade Commission
GE	General Electric
GF	Greenhouse Friendly
GHG	Greenhouse Gas
GS	Gold Standard
GWP	Global warming potential
HFC	Hydrofluorocarbon
IIED	International Institute for Environment and Development
ISO	International Standards Organization
JI	Joint Implementation
KWh	Kilowatt-hour
LULUCF	Land Use, Land Use Change and Forestry
MAC	California Market Advisory Committee
MGGRA	Midwestern GHG Reduction Accord
$MtCO_2e$	Millions of tonnes of carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt-hour
NGAC	New South Wales Greenhouse Abatement Certificate
NGO	Non-governmental Organization

NO_x	Nitrogen oxides
N_2O	Nitrous oxide
NREL	U.S. National Renewable Energy Laboratory
NSW GGAS	New South Wales Greenhouse Gas Abatement Scheme
OTC	Over-the-Counter (market)
RE	Renewable energy
REC	Renewable Energy Credit
REDD	Reducing Emissions from Deforestation and Degradation
RGGI	Regional Greenhouse Gas Initiative
SGER	Specified Gas Emitters Regulation
SO_2	Sulfur dioxide
tCO_2e	Tonne of carbon dioxide equivalent
TREC	Tradable renewable energy credit
The Reserve	Climate Action Reserve
UNFCCC	United National Framework Convention on Climate Change
U.S. EPA	United States Environmental Protection Agency
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Units
VER	Verified (or Voluntary) Emission Reduction
VERR	Verified Emission Reductions-Removals
VOS	Voluntary Offset Standard
WBCSD	World Business Council for Sustainable Development
WCI	Western Climate Initiative
WRI	World Resources Institute
WWF	World Wildlife Fund

Executive Summary

This report was created to answer fundamental questions about the voluntary carbon markets such as transaction volumes, credit prices, project types, locations, and the motivations of buyers in this market. Over the past several years, these markets have not only become an opportunity for citizen consumer action, but also an alternative source of carbon finance and an incubator for carbon market innovation. As the voluntary carbon markets have rapidly gained traction, the answers, to these questions have become increasingly important to investors, policymakers, and environmentalists alike. For example, since the last edition of this report, we have seen various U.S. climate bills make reference to voluntary carbon offset standards, the Japanese government launch a voluntary carbon-offsetting scheme, and the U.K. government issue an official definition of "carbon neutral."

Proving the legitimacy of carbon offset projects remains a major issue in the marketplace, leading to a so-called "flight to quality." Last year saw further establishment and greater functionality of voluntary offset standards; the emergence of new registries; the forging of new partnerships between infrastructure providers; the formation of coalitions to encourage self-regulation; and increased market transparency. At the same time, existing and potential voluntary market consumers became more sophisticated as literature and education around offset quality increased. All of this points to a further maturation of the market in 2008. However, the voluntary carbon markets, like any other commodity market, were not immune to the over-arching forces of the economy and regulatory developments.

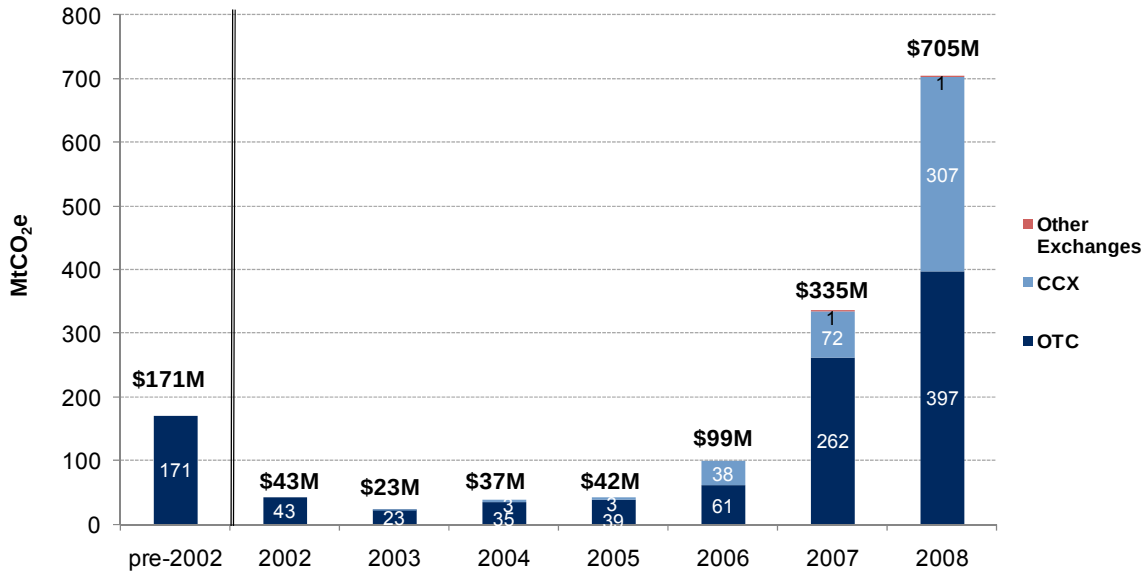
Below we outline the aggregated results of our survey of the state of the voluntary carbon markets in 2008. For the analysis of the "over-the-counter" (OTC) side of the voluntary carbon markets, we obtained data from over 182 suppliers from 28 different countries involving all stages of the supply chain: developers, aggregators, brokers, and retailers. This report is based on the information collected from these suppliers. Hence, numbers throughout this report may not contain every single OTC transaction in the marketplace and should be considered conservative. Alternatively, all data on the Chicago Climate Exchange (CCX) was obtained directly from the exchange and hence presents a greater degree of completeness.

Voluntary Carbon Markets Nearly Doubled in 2008, Reaching 123.4MtCO_2e

We tracked 123.4 million metric tonnes of carbon dioxide equivalent (MtCO_2e) transacted in the global voluntary carbon markets in 2008, a near doubling of 2007 transaction volume (87% growth). Of the two main components that comprise the voluntary carbon markets—the CCX and the OTC—the CCX was responsible for the larger share of the market, trading 69.2MtCO_2e (56%) versus 54.0MtCO_2e (44%) in the OTC market.[1] Not only was 2008 the first year that the CCX overtook the OTC market in terms of tracked volume, it also overtook the OTC market in terms of growth. CCX trades tripled in 2008 (202%), whereas the OTC market grew by 26%—a clear break from the trend in 2007, when the OTC market tripled, while the CCX only doubled.

[1] Note that the remaining 0.2 Mt$C0_2$e was traded on other exchanges besides the CCX.

Historic Values for the Voluntary Carbon Markets



Source: Ecosystem Marketplace, New Carbon Finance.

Transaction Volumes and Values, Global Carbon Market, 2007 and 2008

Markets	Volume ($MtCO_2e$)		Value (US$ million)	
	2007	2008	2007	2008
Voluntary OTC	43.1	54.0	262.9	396.7
CCX	22.9	69.2	72.4	306.7
Other exchanges	0	0.2	0	1.3
Total Voluntary Markets	**66.0**	**123.4**	**335.3**	**704.8**
EU ETS	2,061.0	2,982.0	50,097.0	94,971.7
Primary CDM	551.0	400.3	7,426.0	6,118.2
Secondary CDM	240.0	622.4	5,451.0	15,584.5
Joint Implementation	41.0	8.0	499.0	2,339.8
Kyoto [AAU]	0.0	16.0	0.0	177.1
New South Wales	25.0	30.6	224.0	151.9
RGGI	-	27.4	-	108.9
Alberta's SGER[(a)]	1.5	3.3	13.7	31.3
Total Regulated Markets	**2,919.5**	**4,090.0**	**63,710.7**	**119,483.4**
Total Global Markets	**2,985.5**	**4,213.5**	**64,046.0**	**120,188.2**

Source: Ecosystem Marketplace, New Carbon Finance.

Notes: (a) Assume a CA$10 price for Alberta offsets and Emission Performance Credits based on interviews with market participants.

The strong growth of the CCX in 2008 is attributed to strong trading activity in the first two quarters of the year on the back of introduced climate change legislation in the United States. At the same time, the OTC market was not immune to the global recession and experienced slower activity in the second half of 2008, as companies turned their attention away from environmental impacts and cut discretionary spending.

Of the 54.0MtCO_2e transacted in the OTC market, we were able to confirm that only 12.4MtCO_2e were retired. Retirement is critical in the voluntary markets because it represents the impact of the market from an environmental perspective. Our retirement numbers are particularly conservative given the challenge of confirming the data. However, according to this estimate 23% of the total OTC traded volume was used to directly offset emissions in 2008, and a credit passed hands (also known as the "churn rate") an average of 4.4 times.

Voluntary Credit Prices Increased a Further 20%, Resulting in a Total Market Value of US$705 million

We estimate that the voluntary carbon markets were valued at US$705 million[2] in 2008, more than twice their value in 2007 ($335 million). Despite the OTC market taking a smaller share of the transaction volume than the CCX, most of this value increase was driven by OTC credits, as they traded at a price premium of 66% in 2008 over CCX credits. The average price of a voluntary carbon credit transacted on the OTC market was $7.34/t$CO_2$e in 2008, up 22% from $6.10/t$CO_2$e in 2007 and up 79% from $4.10/t$CO_2$e in 2006. This compares to an average price of $4.43/t$CO_2$e on the CCX. The OTC market transacted an estimated $396.7 million (56% of the total market), whereas the CCX market transacted an estimated $306.7 million (44%).

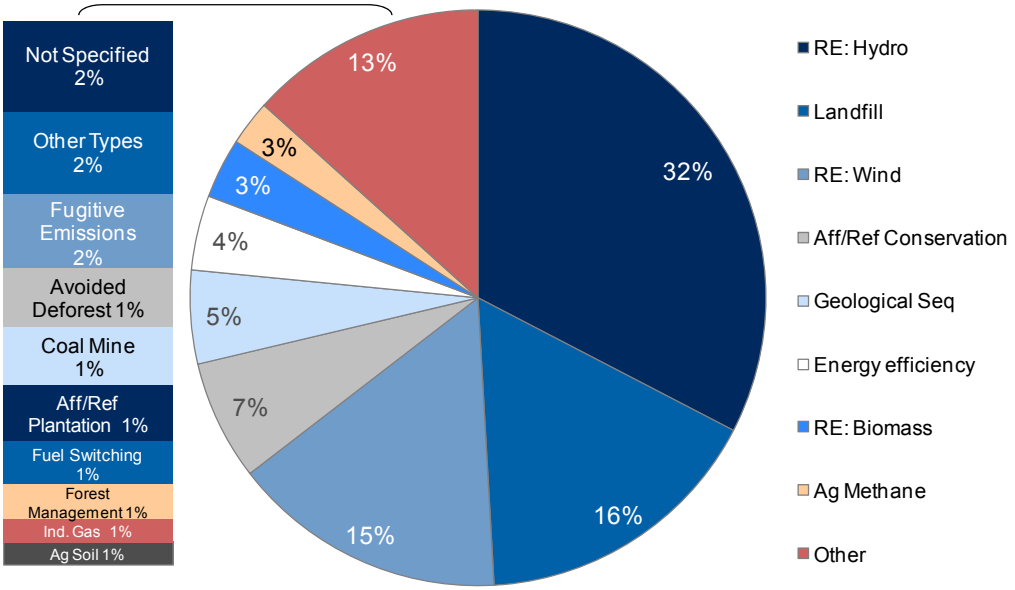
Similar to last year, credit prices increased along the market's value chain, reflecting the transaction costs associated with credits passing into new hands and the general decline of transaction volume along the value chain. We found that prices increased from an average of $5.1/t$CO_2$e for project developers to $5.4/t$CO_2$e at the wholesale level to $8.9/t$CO_2$e at the retail level.

Asia and North America Remained Dominant as Credit Sources

Sources of voluntary offsets on both the CCX and the OTC market are extremely diverse in both project type and location. With regard to OTC project type, renewable energy credits dominated this year, increasing their market share from 27% in 2007 to 51%, mostly from hydropower (32%), wind energy (15%) and biomass energy (3%). The dominance of this project type comes from its general appeal to voluntary buyers and particularly high credit production from a number of Turkish VER projects and Asian pre-registered CDM projects. Landfill gas capture was the second most popular category, capturing 16% of the market (up from 5% in 2007), mostly resulting from a shift towards pre-compliance motives in the U.S. carbon market. In contrast, energy efficiency, fuel switching, and coal mine methane all declined in popularity.

[2] All monetary values in this report are in US$.

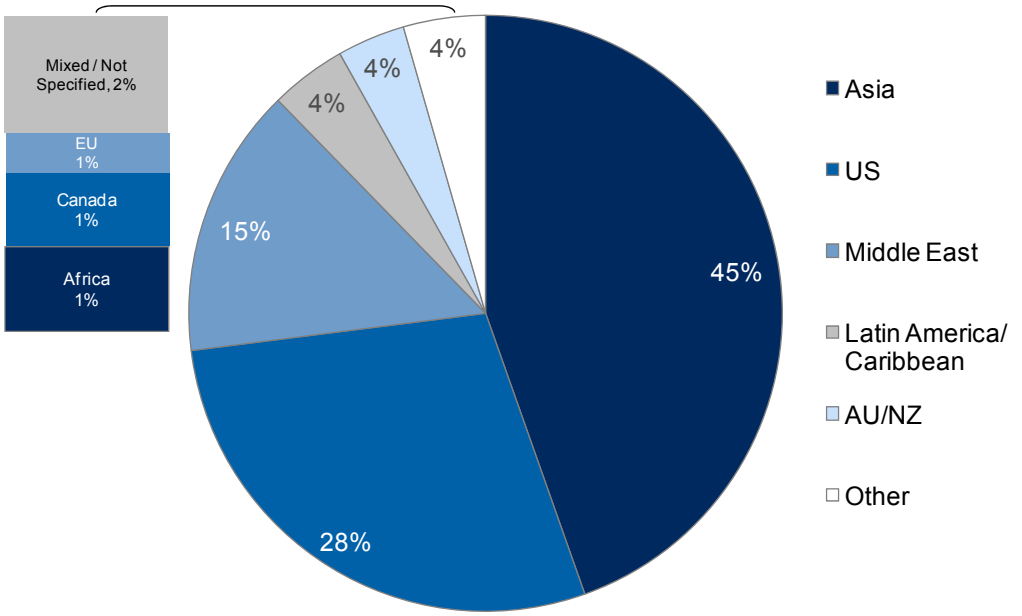
Transaction Volume by Project Type, OTC 2008



Source: Ecosystem Marketplace, New Carbon Finance.

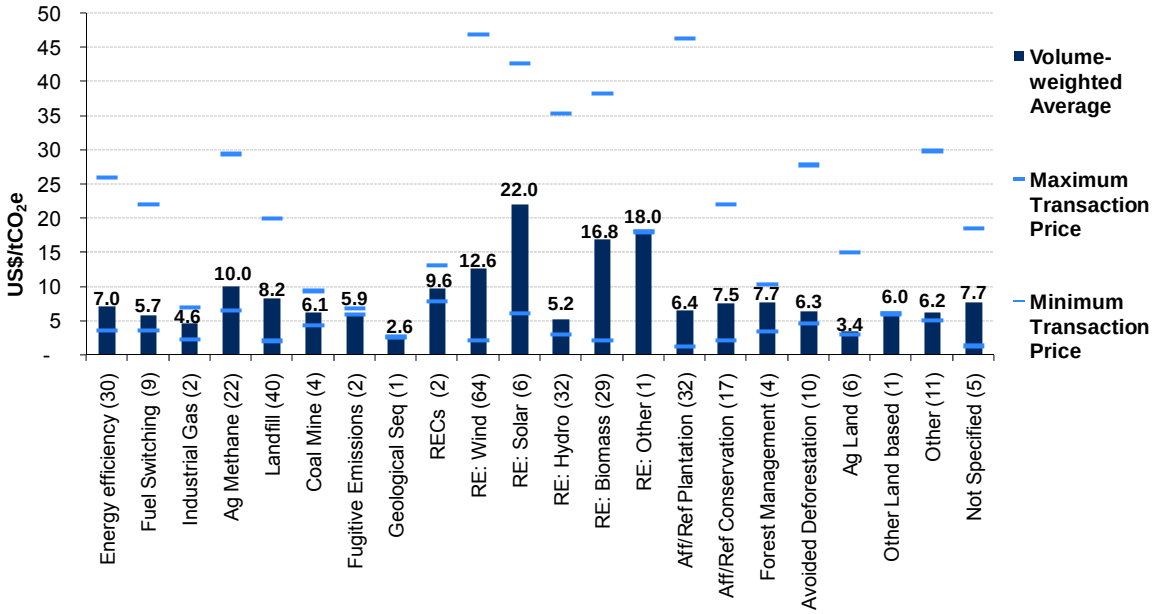
Consistent with its prominence in the CDM market and in line with 2007, Asia was the most popular project location, sourcing 45% of transacted credits in the OTC market. The largest single country, supplying credits was the United States, which was the credit source for 28% of OTC transactions. The Middle East also emerged as a key source of credits, supplying 15% of OTC transaction volume in 2008 as a result of a few large projects in Turkey, which we've included in the Middle East for the purpose of this report. Credits from the EU, Canada, Australia and New Zealand declined significantly on the back of concerns about double-counting emissions reductions as offsets in the voluntary markets and emissions reductions under Kyoto compliance schemes.

Transaction Volume by Project Location, OTC 2008



Source: Ecosystem Marketplace, New Carbon Finance.

Credit Price Ranges and Averages by Project Type, OTC 2008



Source: Ecosystem Marketplace, New Carbon Finance.

Note: Numbers within parentheses indicate number of observations.

Credit Prices Ranged between $1.20/tCO$_2$e and $46.90/tCO$_2$e

OTC credit prices in 2008 covered a wide range ($1.20 to $46.90/tCO$_2$e), but not quite as wide a range as the year before ($1.80 to $300/tCO$_2$e). Project types claiming the highest average prices in 2008 were renewable energy projects, of which solar ($21.98/tCO$_2$e), geothermal (RE: other, $18.00/tCO$_2$e), and biomass energy ($16.84/tCO$_2$e) claimed the highest spots. At the low end of the range were geological sequestration ($2.58/tCO$_2$e), agricultural soil sequestration ($3.35/tCO$_2$e), and industrial gas credits ($4.57/tCO$_2$e).

This year we also collected price data according to the country of project location. Though it was difficult to discern any strong regional trends, on average, credits from New Zealand, South Africa, Malaysia, and Australia fetched a premium over other countries, earning $19.20, $15.40, $14.40, and $13.30 per credit respectively.

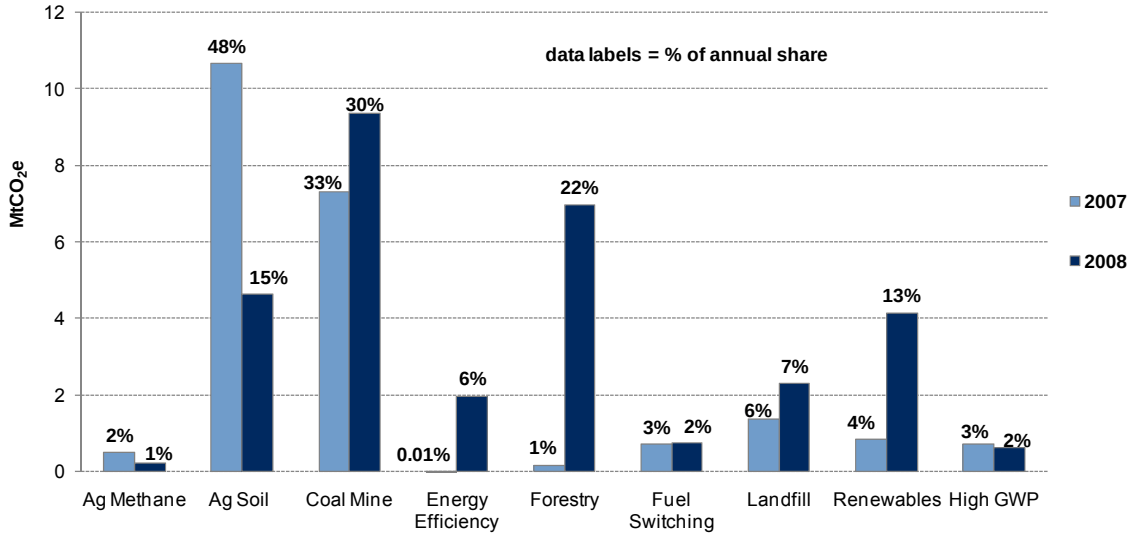
CCX Projects Expanded their Geographical Horizons

This year we also obtained registration information on offset credits registered on the CCX Registry. While this information cannot be directly compared with our OTC data, as registered credits are not necessarily transacted, it does shed light on project type and location trends on the CCX. For instance, newly-registered CCX offsets generated from forestry and renewable energy projects took a tremendous jump in 2008 (21 and 9 percentage points up, respectively), whereas the new registration of offsets from agricultural soil projects declined (down 33 percentage points).

In terms of project location, the major trend seen on the CCX was the increased number of credits from Asia and Latin America. This year, these two regions were responsible for

19% and 21% of total registered credits, up from a 4%-share each in 2007. In contrast, North American countries (Canada and the U.S.) supplied only 60% in 2008, down from 79% in 2007.

Chicago Climate Exchange (CCX) Registered Project Types, 2007 and 2008

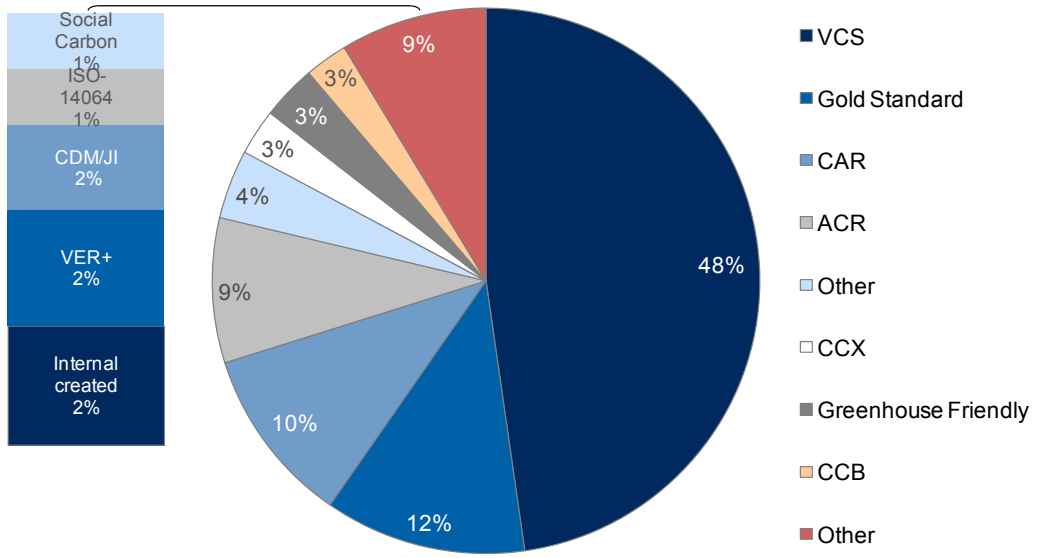


Source: Chicago Climate Exchange.

The Voluntary Carbon Standard Solidified its Leadership Position, Capturing 48% of Credits Verified to a Third Party Standard

If the relevance of third-party verification in the voluntary carbon markets was ever in doubt in 2007, it was solidified in 2008. No less than 96% of credits were third-party verified in 2008, up 9 percentage points from 2007.

Standard Utilization, OTC 2008

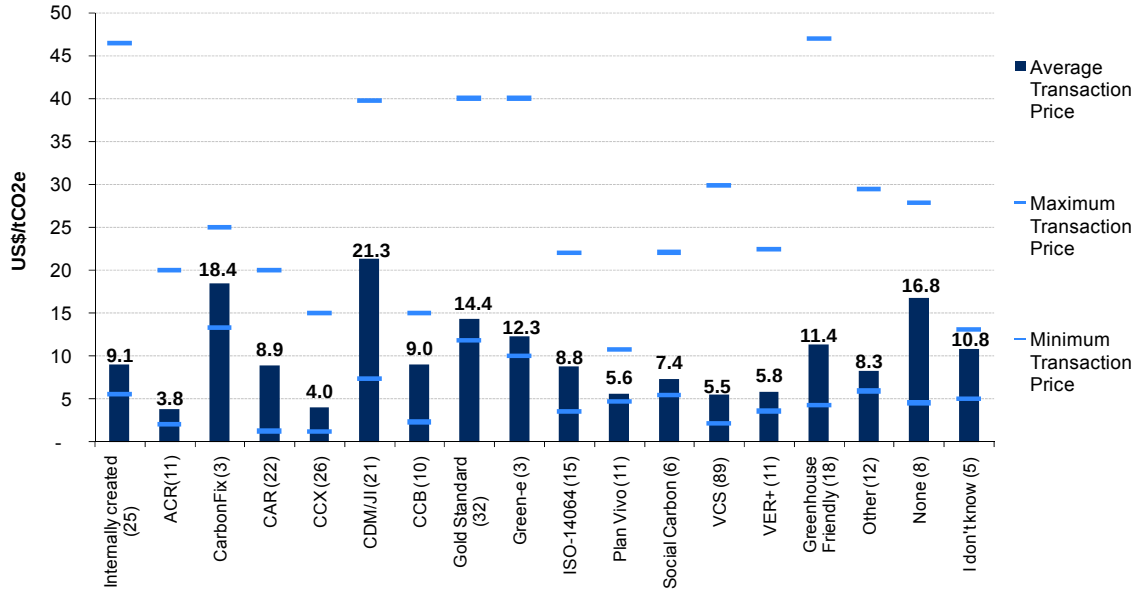


Source: Ecosystem Marketplace, New Carbon Finance.

Last year also saw further consolidation amongst the many standards in the market. Of the 18 identified standards, the most utilized OTC standard by transaction volume was the Voluntary Carbon Standard (48%), followed by the Gold Standard (12%), the Climate Action Reserve Protocols (10%), and the American Carbon Registry Standard (9%). Defying the small interest from last year's respondents, both CAR and the ACR increased on the back of higher pre-compliance activity in the U.S. with landfill gas projects being prominent with these standards.

Losing most OTC market share in 2008 were the CDM/JI, VER+, and the Voluntary Offset Standard (VOS). CDM/JI credits were the second most popular credit type in 2007 (16%) on the OTC voluntary markets, but they dropped to only 2% of the market in 2008. VER+ was another popular standard in 2007 which lost substantial market share (from 9% to 2%).

Credit Prices and Price Ranges by Standard, OTC 2008



Source: Ecosystem Marketplace, New Carbon Finance. Note: Numbers within parentheses indicate number of data points.

Large Numbers of Standards Fetched Above-Average Prices

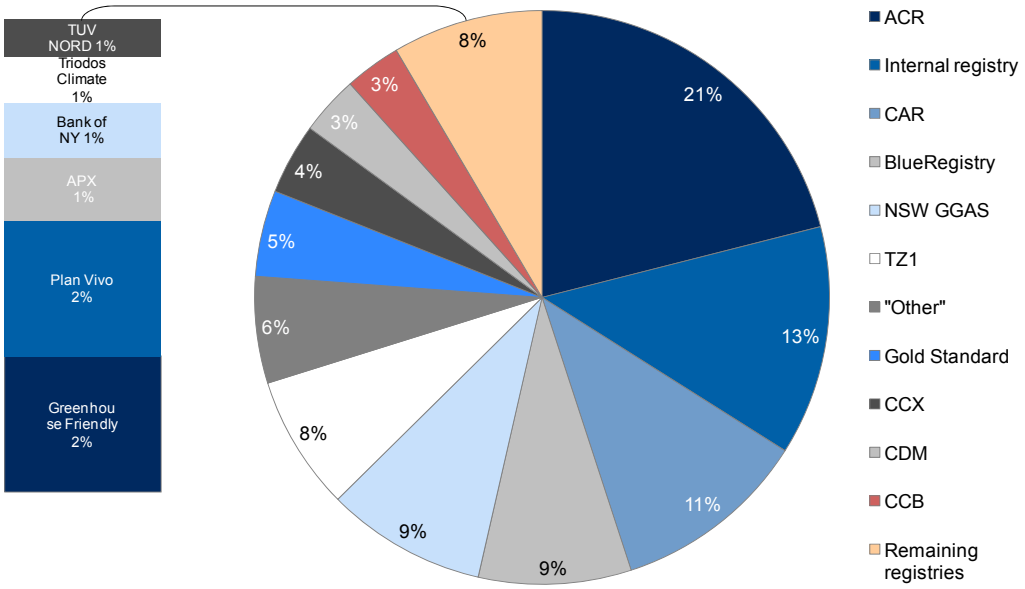
Similar to project type, the verification standard utilized is a major determinant of transaction prices. Although their volumes dropped significantly, CDM/JI credits maintained their price premium, averaging of \$21.31/tCO_2e. Above-average premiums (>\$7.34/tCO_2e) were also paid for CarbonFix, Gold Standard, Green-e, GHG Friendly, CCB Standards, Climate Action Reserve, ISO, Social Carbon and even internally created standards.

The CCX and the ACR were at the bottom of the price spectrum at average transaction prices of less than \$4.0/tCO_2e. This average discount is mostly related to the low carbon prices on the CCX itself and inexpensive reductions achieved via geological sequestration, the most popular ACR project type in 2008.

While Gaining Attention, Registry Usage Still Limited in 2008

A newer infrastructure element of the voluntary OTC market, but one that is receiving increasing attention is the third-party credit-accounting registry. In 2008, at least 29% of voluntary transactions were tracked in a third-party registry. Despite the increase in third-party credit verification and consolidation of standards, this 29% represents a small reduction from the 31% of transaction volume tracked in third-party registries in 2007. We attribute this decline to the lack of a dedicated VCS registry, by far the most popular standard in the market last year. However, it should be noted that of the credits eligible for registration—issued offsets in which emissions reductions have already occurred—64% were transacted via a third-party registry. Therefore we anticipate registry usage to increase substantially going forward.

Uptake of Registries, OTC 2008



Source: Ecosystem Marketplace, New Carbon Finance.

As of the publication of this report, there are at least 18 third party registries serving the voluntary carbon markets. In 2008, the most popular third-party registries in terms of OTC transaction volume tracked were the American Carbon Registry (21%), followed by the Climate Action Reserve (11%), the New South Wales Greenhouse Gas Abatement Scheme Registry (9%) and the BlueRegistry (9%). An additional 13% of OTC transactions were tracked in internal registries. The popularity of suppliers' internal registries is attributed to the unavailability of a VCS registry. The dominance of the ACR is in part related to reporting bias, as the ACR was one of only a handful of registries active in 2008 and supplied its own transaction (as opposed to just issuance) data.

With respect to our 2007 results, most of the registry usage follows the market's trends with regard to third-party standards. Notable changes from last year include the rise of the American Carbon Registry (which took 21% of the 2008 market vs. only 5% of the 2007 market), the Climate Action Reserve (11% in 2008 vs. 2% in 2007), and the NSW GGAS Registry (9% in 2008 vs. 2% in 2007). The CDM/JI registry and CCX Registries each experienced significant declines in market share between 2007 and 2008.[3]

[3] This statement refers to the CDM/JI and CCX registries' prominence in the OTC market, only. Each registry remains the sole registry provider of its respective market.

Although Investment Has Become an Important Motive, CSR and PR Remain the Dominant Driving Forces in the Market

Private companies continue to dominate the buy-side of the voluntary market (66% of volume), with purchasing for investment/resale now the largest overall motivation (35%) instead of retirement (29%). This suggests a higher contribution from intermediaries in the market. Voluntary purchasing by both NGOs and individuals has significantly decreased in 2008 to a mere 1% and 2% respectively, which could represent a reduced interest in voluntary offsetting on the back of negative media publicity as well the onset of the global economic recession in 2008.

Despite the increased importance of investment, however, sellers continue to perceive that Corporate Social Responsibility (CSR) and public relations/branding are the two main driving forces for voluntary purchases. This means that, although many analysts perceive pre-compliance buying as a rising force in the market, our survey results indicate that it remains secondary to the pure voluntary market.

This year's results also confirm that a compliance market does not eliminate the voluntary carbon market, with European buyers purchasing over half (53%) of volumes, up from 47% in 2007. Given the non-existence of a large U.S. compliance market, the United States was responsible for both the greatest demand (39%) as well as supply of credits (28%) of any single country.

Market Participants Expect Continued Growth with Volumes Reaching almost 350MtCO_2e in 2015

On average, suppliers projected an average annual growth of 15% per year from 2009 through 2020 with volumes for the global voluntary market anticipated to increase to 257MtCO_2e in 2012 and 476MtCO_2e in 2020. Participants expected the 2009 market to grow by 21%, which is low relative to the historic average of 95% (2003-2008), but still a good growth rate in the midst of a recession.

When asked about standards they plan to use in 2009, more suppliers (52% of survey respondents) intend to use the Voluntary Carbon Standard (VCS) than any other standard. In 2007, suppliers also reported the VCS as their most-preferred standard for use in 2008, which proved to be correct, as the standard took 48% of the OTC market last year. About 34% of suppliers indicated they will utilize the CDM in 2009, 32% the Gold Standard, 28% the Climate Action Reserve, and 27% the Community, Climate & Biodiversity (CCB) Standards. Note that individual organizations may use multiple standards so percentages do not add up to 100%.

The most popular choices for future registry use were the Climate Action Reserve, the Gold Standard registry, the APX registry, TZ1, and the CDM/JI registry. The popularity of CAR, Gold Standard, VCS, and CDM/JI is consistent with these standards' intended future utilization. The popularity of TZ1 and APX is consistent with a strong interest in the VCS, since these registries both serve the VCS as well as several other standards.

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1 Introduction

The first *State of the Voluntary Carbon Markets* report was launched in 2007 with the goal of "shining a small light into the black hole" of information surrounding the voluntary carbon markets. At that time, carbon offsetting was a relatively new trend and almost no market-wide data was available. Three years later, we are pleased to present this ongoing bird's eye of view of the voluntary carbon markets landscape with more data to report, a greater percentage of the market captured, and a refined methodology. The aim of the report is to answer fundamental questions about transaction volumes, prices, project types, players, and—now with several years of data in hand—to elucidate trends in the marketplace over time.

In last year's report, we introduced the voluntary carbon markets in terms of the organizational psychology team-building phases "storming, norming, forming, and performing." Disaggregated, chaotic, and controversial, the "over-the-counter" market was in a "storming" period during its first couple years in the limelight. From the first voluntary purchase of carbon offsets from a forestry project in 1988 until several years ago, the voluntary markets operated in a relatively sheltered philanthropic niche until around 2005, when the concept of offsetting stepped into the mainstream, gaining transactions, praise, and critics.

With a huge emphasis on emerging third-party standards in 2007, the markets clearly stepped into a "norming" phase. In 2008, market infrastructure development sprinted forward; third-party standard accreditation became the norm; consolidation around a few standards continued; registries stepped in to further track transactions; new partnerships were forged; and transparency was emphasized. Hence, it seems fair to say that last year the market entered the "forming" phase of development.

To some degree this rapid development seems to have been motivated by an "If you build it, they will come" mentality, no doubt justified by buyers' and critics' concerns about offset quality. In addition to serving "pure voluntary" buyers, the voluntary carbon markets are increasingly serving a mass of "pre-compliant" buyers for which a hovering U.S. regulatory stick has taken the shape of a carrot for many entities. However, as of early 2009, pure voluntary buyers remain the core of this marketplace, as this year's survey results reveal.

This report is the result of contacting over 400 organizations, signing numerous confidentiality agreements, and conducting dozens of interviews in order to assess the current state of the voluntary carbon markets. It weaves together information provided by nearly 200 carbon offset retailers, aggregators, major brokers, registries and exchanges—more respondents than our survey has received in each of the previous years. However, we are acutely aware that we cannot capture all transactions. Hence, as in years past, we caution readers that this map of the market does not represent a perfectly complete picture of the market, although we feel certain we captured the vast majority of transacted volume in the voluntary carbon markets in 2008.

We look forward to producing these reports annually to build on the insights and data provided. We hope you will contribute to next year's analysis and help us in our attempts to make this space in the carbon markets more transparent, better understood, and therefore more effective as a tool for reducing greenhouse gas emissions.

2 Capturing the Data: Methodology

Summary Points:

- This report is based on over-the-counter sales and retirement data obtained from a large number of offset suppliers and intermediaries, as well as registries and exchanges.
- 167 suppliers from 28 countries responded to this year's survey, in addition to information obtained from seven credit accounting registries and four exchanges. We were able to attain data for 15 more offset suppliers by surveying registries and exchanges, which–combined with the supplier responses– resulted in a total of 182 suppliers (78% of the confirmed suppliers to the market) worth of data for the report.
- Most respondents were based in the United States (U.S.), followed by Australia, United Kingdom (U.K.), Canada, and the Netherlands, in declining order. We believe we have captured at least 90% of global voluntary transactions.

This report is based on data collected from offset suppliers, brokers, carbon credit-accounting registries, and exchanges participating in the voluntary carbon markets. The bulk of data was collected via an online survey designed for organizations supplying credits into the OTC voluntary carbon market. The survey was posted publicly between 12 January and 15 April 2009. We complemented the survey data with data provided by major brokerage firms such as Tullett Prebon, Evolution Markets, CantorCO_2e, and TFS Green as well as registries and exchanges including TZ1, American Carbon Registry, TUV NORD's Traceable VER Registry, the Climate Action Reserve, BlueRegistry, the Chicago Climate Exchange, Asia Carbon Registry, and the Australian Climate Exchange.

We received survey information from 167 organizations that supplied carbon offsets to voluntary buyers in or before 2008. We were able to attain data for 15 more offset suppliers by surveying registries and exchanges, bringing the total to 182 suppliers. This report presents only aggregate data; all supplier-specific information is treated as confidential. Additionally, we do not identify prices from any country for which we had fewer than three data points to protect the confidentiality of the supplier's transaction information. We also chose to provide a country-breakdown for only those countries that yielded an unusually large volume of credits for their region or that were one of only a few countries in the region (e.g. North America or Australia/New Zealand). Volume, value, and price information is rounded throughout the report, and as a result some figures depicting market share do not sum to 100%.

For a list of names and websites of non-anonymous survey respondents that classified themselves as carbon offset sellers, see the Appendix.

We also utilized data shared by the CCX on the project type, location, and vintage of credits registered in the exchange from 2006 to 2008. When comparing this information to the information we have collected on OTC transactions, it is important to emphasize the difference between credits issued/registered and those transacted. Since we were unable to obtain information on CCX offset credits transacted on the exchange, direct comparisons are difficult.

2.1 Utilization of supplier-provided data

The goal of our data collection process was to collect information from as many suppliers across the marketplace as possible. Because of the fragmented nature of the market and confidentiality issues surrounding transaction data, it is impossible to capture information from all suppliers. From our list of identified suppliers in the voluntary carbon market, we estimate that around 78% of existing suppliers provided data, directly and indirectly, for this report.

Since respondents had the option of skipping questions, the response rate varied by question. The number of respondents per question is noted throughout the report. Many suppliers were especially reticent to share price and volume data, and as a result only 63% of respondents chose to share volume data. However, additional suppler-specific volume data was attained via registry and exchange surveys as well as publicly available sources, so overall we attained volume data from 137 of the 182 offset suppliers whose data is included in this report. Although it is impossible to determine the volumes that we were not able to track, we believe that through the use of extensive registry and broker data, we have captured at least 90% of the total market.

Because many of the calculations in this report are weighted by respondents' transaction volumes, responses from suppliers who did not disclose 2008 transaction volumes were not included in many final figures, as it could not be ascertained how significant their answers were to the OTC market. For organizations that disclosed volume data but not price data, we used the market-wide average price as a proxy in our monetary valuation of the overall market.

2.2 Accounting Methodology

For the purpose of this report, we define the "voluntary carbon markets" as all purchases of carbon credits that are motivated by a driver other than regulatory compliance. This includes transactions involving credits created for the voluntary markets (such as Verified Emission Reductions or Carbon Financial Instruments) as well as transactions in which suppliers sold regulatory market credits (such as Certified Emission Reductions) to voluntary buyers. All financial figures presented in this report are based in U.S. Dollars unless otherwise noted.

The numbers presented throughout this survey are measured in metric tonnes of carbon dioxide equivalent (tCO_2e). Data presented in the following pages is based purely on information volunteered by marketplace participants. The only data extrapolation the authors made involved using the average OTC market price to attain a monetary valuation of the overall market (using the average price for reported volumes that lack corresponding price data). We chose not to extrapolate on the data provided any further. In general, we did not apply any "quality criteria" screens, but we did investigate news sources and contacted dozens of respondents to confirm or clarify their responses.

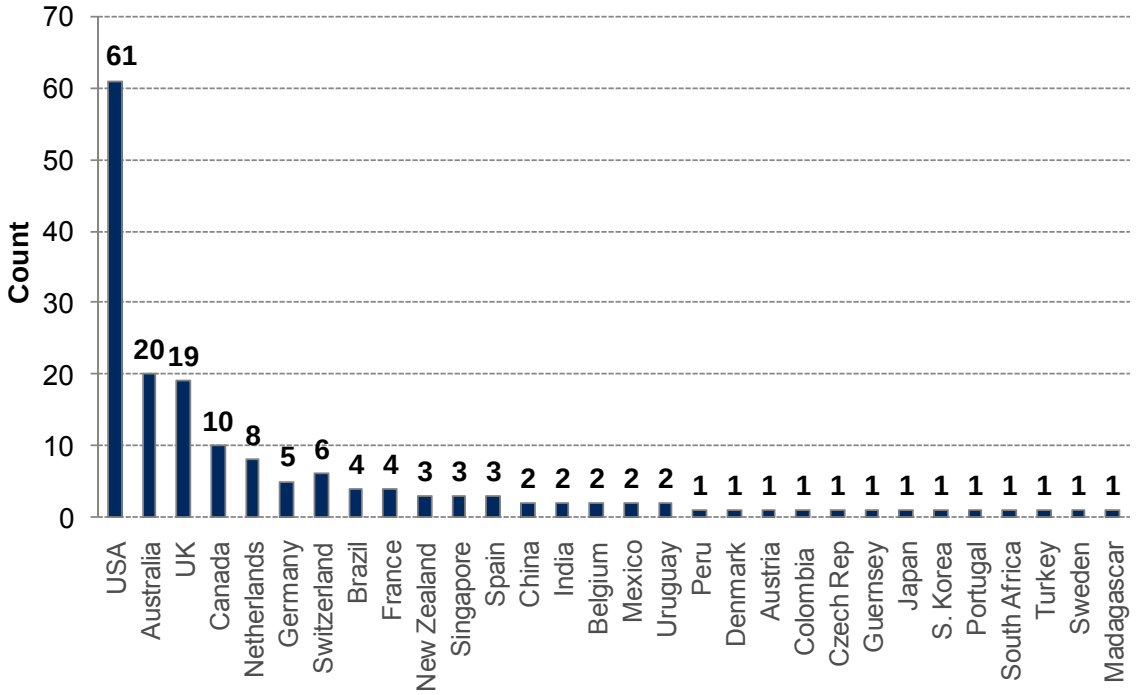
Because we collected data from brokers and registries as well as suppliers, we risked counting some transactions twice. To minimize the chance of "double-counting", we asked respondents to specify whether they utilized a broker to sell credits, sold credits on the Chicago Climate Exchange (CCX), or registered transactions on any third-party credit-accounting registry. When we identified an overlap, the transaction was counted only once. It is important to note that–with the exception of the CCX market, which is

analyzed separately from the bilateral (OTC) sales of CCX credits in this report– we only used registries to track *actual* sales and have not included emissions reductions registered but not yet transacted. This report largely encapsulates transactions in the marketplace, rather than the individual "lives" of credits. For example, if a credit was sold in 2007 by a project developer to a retailer who then sold the credit to a final buyer in 2008, we might not have been able to track both transactions in the same year and likely counted each individual transaction separately in different report years. We also collected retirement data to account for the end-consumption of offsets, at which point a credit can no longer be resold.

2.3 Response Distribution

As illustrated by Figure 1, the majority of survey respondents were based in the United States. After the United States (U.S.), the country with the second most respondents was Australia, followed by the United Kingdom (U.K.), Canada, and the Netherlands. This response distribution seems to match the OTC marketplace trends at the retailer, broker, and wholesaler levels. For example, given the absence of national regulated markets in the U.S. and Australia, it should be expected that carbon offset providers to voluntary buyers are particularly prevalent in the United States and Australia. The high number of suppliers based in Europe, in particular in the United Kingdom, coincides with the significant number of European-based buyers, the region's environmental awareness, and London's position as a hub for the regulated carbon markets.

Figure 1: Survey Participant Location, OTC 2008[1]



Source: Ecosystem Marketplace New Carbon Finance. (1) Based on 170 data points

While the locations of respondents matches the locations of the bulk of intermediary sellers in the marketplace, we believe there are dozens of project developers generating and selling to voluntary buyers across the globe, especially in Latin America and Africa, than we were able to survey. We found it most difficult to track and contact project

developers in these regions, especially those whose primary service is something other than supplying carbon offsets. Furthermore, one limitation for suppliers in non-English speaking regions may have been that the survey was only provided in English. Hence, these segments of the value chain may be underrepresented in this report, although those transactions that went through brokerage firms, wholesalers, and retailers were included.

3 Voluntary Carbon Markets: The Basics

Summary Points:

- The voluntary carbon markets can be broken down into two markets: the Chicago Climate Exchange (CCX) and the "Over-the-Counter" (OTC) market.
- The Chicago Climate Exchange (CCX) is the world's only voluntary cap-and-trade system.
- This report primarily focuses on the OTC market, which is based on bilateral deals and operates largely outside of exchanges.
- At least four governments have instituted voluntary offset programs.

The worldwide carbon markets can be divided into two segments: the voluntary markets and the regulatory (compliance) markets. As the name implies, the voluntary carbon markets include all carbon offset trades that are not required by regulation. The voluntary carbon markets themselves have two distinct components: the Chicago Climate Exchange (CCX), which is a voluntary but legally binding cap-and-trade system, and the broader, non-binding "Over-the-Counter" (OTC) offset market.

Since the CCX operates as a formal market and is already tracked in detail, the majority of this report is focused on the fragmented OTC voluntary market. The data concerning Exchange-traded CCX credits provided in this report was obtained directly from the CCX.

3.1 The Chicago Climate Exchange (CCX)

The 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."[4] It is driven by a membership-based cap-and-trade system. Members voluntarily join the CCX and sign up to its legally-binding reductions policy. Like the Kyoto markets, the CCX trades six different types of greenhouse gas (GHG) emissions converted into one common unit denominated in tonnes of carbon dioxide equivalent (tCO_2e).

There are three levels of membership in the CCX:

- **Full Members** are entities with significant direct GHG emissions who have committed to reducing their emissions 1% per 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 must only reduce an additional 2% between now and 2010, while new members need to reduce 6% during this time.[5] As of April 2009, there were 92 Full Members of the CCX.
- **Associate Members** are entities with negligible direct GHG emissions. Associate Members commit to report and fully offset 100% of their indirect emissions associated with energy purchases and business travel from year of entry through 2010. As of April 2009, 52 companies were participating as Associate Members.

[4] Available online at: http://www.chicagoclimatex.com.
[5] Ibid.

- **Participant Members** are project developers, offset providers, offset aggregators, and liquidity providers, the last of which trade on the Exchange for purposes other than complying with the CCX emissions reduction schedule. As of April 2009, there were 33 offset providers, 92 offset aggregators, and 68 liquidity providers participating in the CCX.

The CCX's unit of trade is the Carbon Financial Instrument (CFI), which represents 100 tCO_2e. CFIs may be either *allowance-based credits*, issued to emitting members in accordance with their emissions baselines and the exchange's reduction goals, or *offset credits* generated from qualifying emissions-reduction projects. Offset-based credits can only be used to offset 4.5% of a member's total emissions reduction requirement, so the vast majority of credits traded on the CCX are allowance-based.

In 2008, the CCX launched the Chicago Climate Futures Exchange (CCFE) to trade future contracts and derivatives based on different climate emissions vehicles, including regulatory instruments and offset credits. Traded products on the CCFE are the CCX CFI, Regional Greenhouse Gas Initiative (RGGI) allowances, regulatory compliance credits for a future U.S. federal system, Kyoto Clean Development Mechanism Certified Emission Reduction (CER) credits, and Climate Action Registry (CAR) Climate Reserve Tons (CRTs).

The CCX is owned by the Climate Exchange Plc group of companies, which also includes the European Climate Exchange (ECX), the Montreal Climate Exchange, and the Tianjin Climate Exchange.

3.2 The Voluntary "Over-the-Counter" (OTC) Market

Outside of the CCX, one finds a wide range of voluntary transactions that make up a voluntary market not driven by any sort of emissions cap. Because this market is not part of a cap-and-trade system where emissions allowances can be traded, almost all carbon credits purchased in this voluntary market originate from emissions reduction projects and are thus offsets. Additionally, because this mass of transactions does not occur on a formal exchange, we have labeled it the voluntary "Over-the-Counter" (OTC) market.

Credits sourced specifically for the OTC market are often generically referred to as Verified (or Voluntary) Emission Reductions (VERs), or simply as carbon offsets.[6] However, OTC buyers may also voluntarily purchase credits from compliance markets such as the Clean Development Mechanism (CDM) or RGGI.

The OTC market is driven by "pure voluntary" or "pre-compliance" buyers. Pure voluntary buyers purchase credits to offset their own emissions and thus "retire" their credits immediately upon purchase. Without a cap and with an emphasis on public relations and ethics, the demand curve for these pure voluntary offset purchases has as much in common with the markets for Fair Trade or organic cotton as it does with the regulated carbon markets. See Section 10 for a more complete analysis of buyer motivations. Pre-compliance buyers purchase VERs with one of two goals in mind: to receive early-actor credit under a regulatory scheme for their voluntary offset purchase made at a cheaper price, or to sell them at a higher price to entities regulated under a

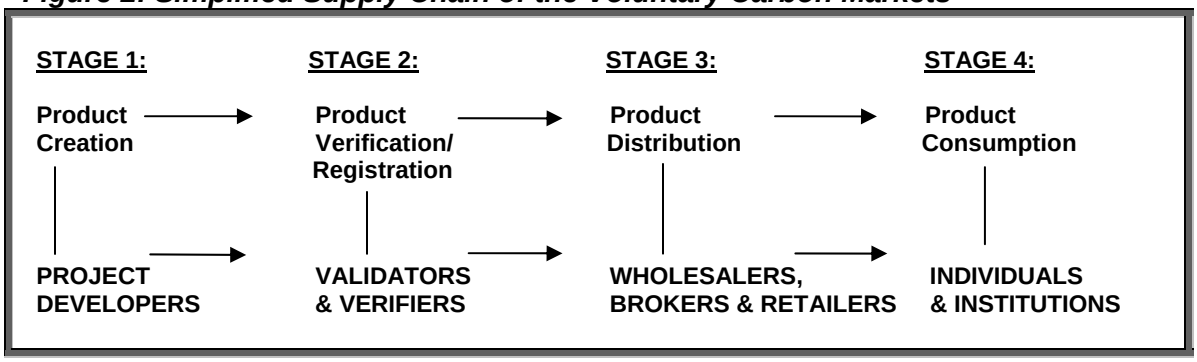
[6] The term VER is also used specifically to refer to credits generated by aspiring CDM projects that have not yet been registered by the CDM Board. Once registered, these projects will generate CERs.

future compliance cap-and-trade scheme. Companies with the first goal are entities likely to be regulated, and companies with the second goal are largely financial firms.

Suppliers in the offset market include retailers selling offsets online, conservation organizations hoping to harness the power of carbon finance, developers of potential Clean Development Mechanism (CDM) or Joint Implementation (JI) projects with credits that—for a range of reasons—cannot currently be sold into the CDM or JI markets, project developers primarily interested in generating VERs, and aggregators of credits. Depending on their position in the supply chain, sellers can be categorized into four major types:

- **Project Developers:** Develop GHG emissions reduction projects and may sell the credits to aggregators, retailers, or final customers.
- **Aggregators/Wholesalers:** Only sell offsets in bulk and often 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.
- **Brokers:** Do not own credits, but facilitate transactions between sellers and buyers.

Figure 2: Simplified Supply Chain of the Voluntary Carbon Markets



Source: Adapted from Ricardo Bayon, Amanda Hawn, and Katherine Hamilton, Voluntary Carbon Markets, A Business Guide to What They Are & How They Work, 2nd edition. 2009. EarthScan.

Within the voluntary OTC market, organizations are increasingly vertically integrated and frequently operate in more than one of these categories. Many suppliers are also engaged in business activities other than selling VERs. For example, most major brokerage firms dealing in VERs also transact in the regulated markets or in other emissions markets. Alternatively, for several major non-profits supplying offset credits, the voluntary carbon market is only one of numerous financial streams enabling conservation projects.

There are a range of value-chain patterns in the OTC market. At the most simple level, a final buyer purchases credits and retires them from a project developer. At a more complex level, an offset credit will pass in a brokered deal between a project developer and an aggregator and is then sold to a retailer who then sells it to the final buyer. Before 2006, it is likely that most VERs were purchased directly from project developers or were retired and sold by retailers who purchased them from project developers. However, as the market has matured, the number of intermediaries facilitating transactions has increased.

3.3 Examples of Government Voluntary Offset Programs

In several cases, governments have instituted voluntary emissions reduction and carbon offset-purchasing programs. When deciding whether to include these programs in this analysis of the voluntary carbon markets, we screened and categorized these programs based on whether they contributed to a country's regulatory requirements or supported pure voluntary buys. For example:

- **Japan's Keidanren Voluntary Action Plan on the Environment:** Japan's Kyoto commitment is to reduce GHG emissions to 6% below its 1990 levels within the first commitment period from 2008 to 2012. One aspect of the country's reduction strategy is the Keidanren Voluntary Action Plan, which encompasses 61 different Japanese business associations and corporations. Member companies in the Keidanren Voluntary Action Plan have committed to reducing their average emissions from 2008 to 2012 to below 1990 levels. Despite lacking legally binding emissions reduction requirements, the Keidanren Voluntary Action Plan is positioned as a Kyoto Protocol Target Achievement Plan.[7] Offset credits are, in theory, purchased voluntarily. However, the only viable offsets are Kyoto credits or credits generated through Ministry of Economy Trade and Industry Domestic Credit Program. All purchases are accounted for in a national registry system and used to meet Kyoto commitments.

  In June 2008, Japan announced that it would also create a trial Emissions Trading Scheme. The aim is to bring as many companies as possible into the scheme with an eye towards an eventual compliance cap-and-trade program. Under the trial scheme, companies set their own emissions limits—either as a percentage of their total emissions or on a per unit of production basis—and may purchase allowances from other companies below their self-imposed targets or buy Kyoto CDM credits to meet their targets. Tokyo Electric Power, Asia's largest utility and an early critic of the scheme, and Chubu Electric Power have both signed on to the trial, announcing a target of 20%-reduction in emissions intensity from 1990 levels through 2013.

  In both cases these programs can be considered "semi- mandatory" since meeting the target is not required by law, emissions reductions are calculated in Japan's Kyoto commitments, and most companies are compelled to meet the target at a reputational level. Hence, they are not included in this report. We have attempted to track any credits purchased in Japan outside these systems.

- **The U.S. EPA's Climate Leaders** program encourages industrial partners to develop comprehensive climate change strategies by completing a corporate-wide inventory of their greenhouse gas emissions based on a quality management system, setting aggressive reduction goals, and annually reporting their progress to the EPA. Companies that meet their reduction targets through internal emissions reductions in combination with voluntary offset and renewable energy credit purchases receive public recognition from the EPA, similar to the EPA's Energy Star program. In September 2008, EPA Climate Leaders released its voluntary offset guidance, which is poised to become performance-based standards for seven offset project types and two more types under development in the near future.

- **Australia's Greenhouse Challenge Plus** program was created to help Australian companies improve energy efficiency and reduce GHG emissions. Like the U.S. EPA Climate Leaders program, this government program includes emissions reduction

progress reporting and technical assistance. A particularly unique aspect of the Greenhouse Challenge Plus program is the Greenhouse Friendly Initiative, which certifies credits from emissions abatement programs as well as "carbon neutral" claims. Although this initiative is part of a government program, we have chosen to include as much information as possible from this program in our analysis, as the program is based on purchases made by non-regulated entities. It is thus purely voluntary, as GHG emissions are not yet regulated at a national level. Furthermore, the program allows entities to utilize credits that are not part of a regulatory system.

- North of the U.S. border, the **Canadian GHG Clean Start Registry** provides similar opportunities to Canadian businesses seeking to gain recognition for their greenhouse gas-reduction efforts while ensuring that those claims are made in a transparent and standardized way. The program, instantiated in early 2009, requires conformation to ISO 14064 standards for emissions calculations and internal reduction efforts, and allows for companies wishing to make a claim of full carbon neutrality to purchase carbon offsets that have been: (a) registered on a public registry, (b) certified by a third-party, and (c) serialized and retired.

4 The Regulatory Context

Summary Points:

- The Kyoto Protocol (Kyoto) is the legally binding international agreement that launched the largest carbon compliance market in the world. As of April 2009, 184 countries had signed up with 37 industrialized countries having agreed to a target of reducing emissions by an average of 5.4% below 1990 levels over the period 2008-2012.
- Countries that ratified Kyoto can achieve their targets via three "flexibility mechanisms": Emissions Trading, Joint Implementation (JI), and the Clean Development Mechanism (CDM).
- Although the U.S. did not ratify Kyoto, many legally-binding state and regional American GHG reduction initiatives exist or are coming into existence including: the Regional Greenhouse Gas Initiative (RGGI), California's Global Warming Solutions Act (AB 32), the Western Climate Initiative, and the Midwestern GHG Reduction Accord (MGGRA).

As the name suggests, voluntary carbon credit transactions are defined by the lack of an enacted regulatory driver. 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.

4.1 The Kyoto Protocol

The Kyoto Protocol is a legally binding agreement under which 37 industrialized countries[8] (as of late April 2009) have agreed to reduce their collective GHG emissions to an average of 5.4% below their 1990 emissions levels over the period 2008-2012. It is under the Kyoto regime, which came into effect in 2005, that the world's largest GHG markets have evolved.[9] These markets are 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 reduction commitments. The mechanism has resulted in the European Union Emission Trading Scheme (EU ETS), which involves all EU member states and is currently the world's largest multinational GHG-emissions trading scheme. Credits traded under the system are called European Union Allowances (EUAs). In 2008, the EU ETS market traded 2,978MtCO_2e, and the market was valued at $94,276 million.[10]

[8] United Nations Framework Convention on Climate Change (UNFCC), "Kyoto Protocol Status of Ratification." Available online at http://unfccc.int/kyoto_protocol/background/status_of_ratification/items/2613.php.
[9] Six GHGs are regulated under the Kyoto Protocol: carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons.
[10] New Carbon Finance.

- **Joint Implementation (JI)** allows emitters in developed countries (referred to as Annex-I 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 2008, 145MtCO_2e of ERUs were transacted, valued at $2,237 million
- **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; the CDM is currently set to run until 2012. Carbon offsets originating from registered and approved CDM projects are called Certified Emission 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 "set the bar" for VER projects in developing and developed countries alike. CERs and ERUs can also be sold in the voluntary markets. In 2008, CER transaction volume fell approximately 30% to 381MtCO_2e (valued around $5,883 million) due to verification bottlenecks at the CDM Executive Board and smaller average project sizes. This supply contraction has not affected the secondary market for CERs, however, which transacted 565MtCO_2e and was valued at $14,083 million in 2008.[11]

4.2 North America

The development of regulated carbon markets in North America has been fragmented, particularly in the U.S. where lack of federal regulation and the rejection of the Kyoto Protocol have led to a handful of regional attempts at regulating greenhouse gas emissions. Canada and Mexico, both parties to the Kyoto protocol, are in the process of creating national-level carbon trading schemes as well as participating across borders in several U.S. regional schemes.

4.2.1 U.S. Regional Programs

- On the East Coast, ten states (Connecticut, Delaware, Maryland, Massachusetts, Maine, New Hampshire, New Jersey, New York, Rhode Island, and Vermont) developed the **Regional Greenhouse Gas Initiative (RGGI)**, a regional strategy to reduce CO_2 emissions from the electricity sector through a cap-and-trade system. RGGI is the only active market in the U.S.; it launched in S and has conducted three successful allowance auctions to date. The three auctions sold 77.9 million allowance credits raising $262 million for energy efficiency, renewable energy and other consumer benefit programs in the ten RGGI states.[12] Member states anticipate auctioning close to 100% of their annually allocated allowances, which represent approximately 171MtCO_2e/yr.

  Initially participants can compensate for up to 3.3% of their emissions by purchasing offset-based credits from projects located in the United States. If the average allowance price goes above $7/short t$CO_2$e, offsets can be used for up to 5% of emissions, and if prices rise above $10/short t$CO_2$e, participants can use offsets for

[11] Ibid.
[12] "States release results for third RGGI auction." Available online at: http://www.rggi.org/docs/Auction%203%20News%20Release%20MM%20Report.pdf.

10% of their emissions. Under this last scenario, offsets may be used from the Kyoto Protocol's CDM.[13]

- On the opposite coast, the **Western Climate Initiative** (WCI) announced a partnership between 11 North American jurisdictions in 2007—Arizona, California, Montana, New Mexico, Oregon, Utah and Washington in the U.S., and British Columbia, Manitoba, Ontario and Quebec in Canada—to collectively reduce greenhouse gas emissions to approximately 15% below 2005 levels by 2020. Six other U.S. States, six Mexican states, and the Canadian state of Saskatchewan participate as observers to the Initiative. Like RGGI, the WCI plans to implement a cap-and-trade scheme, set to start in 2012, to achieve its emissions reductions to companies in the electricity generation sector and industrial or combustion practices that emit more that 25,000tCO_2e annually. In 2015, the coverage will expand to incorporate transportation and domestic fuels as well as industrial combustion below the 25,000tCO_2e threshold. The scheme will also incorporate offset credits generated under a number of protocols focused on agriculture, forestry and waste management, and may accept offset credits from other regional or international markets.[14]
- A third regional cap-and-trade program is also in the making—the **Midwestern Regional GHG Reduction Accord** (MGGRA). This program consists of the following members: Iowa, Illinois, Kansas, Minnesota, Wisconsin, Michigan, and Manitoba (Canada). The Midwestern Greenhouse Gas Reduction Accord was signed in November 2007 and aims to incorporate an approximate emissions target of 16% below 2005 levels. The program is scheduled to start in 2012 and will incorporate a regional cap-and-trade system covering most sectors of the economy, approximately 1,107MtCO_2e/yr by 2012, making it slightly larger than the WCI.

4.2.2 State/Provincial Programs

- 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 organization created by law to implement projects that avoid, sequester, or displace CO_2 emissions.[15]
- In 2003, **Washington State** followed suit and began regulating CO_2 emissions from power plants larger than 25MW. Plants are required to offset 20% of emissions over a 30-year period. In 2006, Massachusetts put in place an emissions cap on 6 energy facilities, limiting emissions to historical levels; these facilities are now regulated through the RGGI emissions trading scheme, and the Massachusetts program has been phased out.[16]
- California's **Global Warming Solutions Act (AB 32)** is the first U.S. statewide program to cap all GHG emissions from major industries and include penalties for

[13] Ibid.
[14] ECOS, "Regional Cap-and-Trade Programs," March 2009. Available online at: http://www.ecos.org/files/3529_file_March_2009_ECOS_Green_Report.doc?PHPSESSID=9eefab6e98ee58e170c96ac4a64d0f5c.
[15] The Climate Trust, "About Us," Available online at http://www.climatetrust.org/programs_powerplant.php.
[16] Stockholm Environment Institute, *A Review of Offset Programs*, 2008. Available online at: http://www.sei-us.org/climate-and-energy/SEIOffsetReview08.pdf

non-compliance. Under the Act, California's State Air Resources Board (CARB) is required to create, monitor, and enforce a GHG-emissions reporting and reduction program. The California Market Advisory Committee (MAC) was created in December 2006 to provide recommendations on the implementation of the Act. In the implementation of AB 32, Governor Schwarzenegger authorized CARB to establish market-based compliance mechanisms to achieve reduction goals. Participation in the WCI is one of the MAC's recommendations, and the state is one of the leading partners in the Initiative.[17]

- North of the border, the **Alberta-Based Specified Gas Emitters Regulation (SGER)**, which entered into effect in 2007, requires entities in the province's energy, chemical, and electricity sectors that emit more than 100,000MtCO_2e per year to reduce their GHG intensity by a one-off 12% relative to the baseline. Affected companies have four mechanisms for compliance: internal efficiency improvements; purchase of Alberta-based offset credits (called Verified Emission Reduction Removals or VERRs); paying into the Climate Change and Emissions Management Fund; or purchasing Emission Performance Credits from covered facilities exceeding their emission-intensity reduction target.

  Companies that choose to purchase offsets for compliance must do so from projects following the Alberta Offset Protocols, which consist of 25 quantification protocols based on the ISO 14064-2 standards along with 3 draft protocols under "closed review" and 18 protocols in the review pipeline. The Alberta Offset System features a public offsets registry known as the Alberta Emissions Offset Registry, a partnership between Climate Change Central and the Canadian Standards Association's GHG CleanProjects Registry. 2.75MtCO_2e of verified offsets were transacted for the 2008 compliance period, and another 1.0MtCO_2e of offsets were purchased in the same period but were banked for use in the next compliance period. The scheme launched in 2007, but major trading volume has yet to occur on account of regulatory uncertainty at the federal level. However, the protocols are increasingly being viewed as pre-compliance standards for an impending Canadian federal scheme, especially considering that many Alberta protocols are listed in Canada's "Fast Track" offset program, which aims to advance a ramp-up of offset supply for the early stages of a Canadian federal cap-and-trade system.

[17] California Environmental Protection Agency, "Expert Advisors Release Final Cap-and-Trade Report: Recommendations Intended to Complement California's Ongoing Efforts to Reduce Emissions," 29 June 2007. Available online at: http://www.climatechange.ca.gov/notices/news/2007-06-29_MAC_FINAL_RELEASE.PDF.

5 2008 Size and Growth

Summary Points:

- The voluntary carbon markets experienced another year of strong growth with volumes up 87% from 2007, reaching 123.4MtCO_2e transacted and a total value of US$705 million.
- In contrast to 2007, the CCX grew faster than the OTC market in 2008, resulting in respective shares by volume of 56% and 44%. The voluntary markets, however, remain marginal with respect to the global carbon market (which includes the voluntary markets), representing only 2.9% of its volume and 0.6% of its value.
- The average price of a voluntary carbon credit transacted on the OTC market was US$7.34/t$CO_2$e in 2008, up 20% and 79% from 2007 and 2006 respectively.
- Although the main goal of the voluntary markets is retiring credits, and thus removing GHG emissions from the atmosphere forever, the total volume of retired credits remained at 12MtCO_2e in 2007 and 2008. However, the share of retired versus transacted credits decreased in 2008.
- Across the carbon market value chain, the price for voluntary carbon credits increased from an average $5.10 at the project developer stage to $5.40 at the wholesale level to $8.90/t$CO_2$e at the retail stage.

In this section of the report we have aggregated our transaction figures to give an overall view of the volume and value of voluntary carbon market in 2008 as well as an in-depth look at how transactions differ in different parts of the value chain.

5.1 Doubled Up: Size of the Voluntary Markets

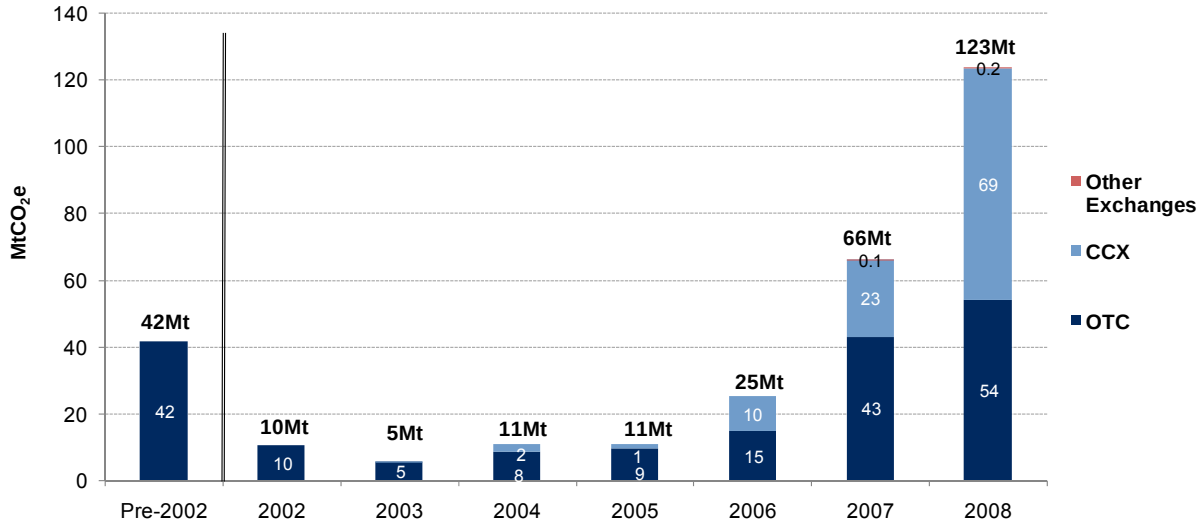
In 2008, we tracked a total volume of 123.4MtCO_2e transacted in the global voluntary carbon markets (see Figure 3). This represents a near doubling (87% growth) in volume between 2007 and 2008 but a reduced rate of growth from 2007 (164%). Over half of this volume, 69.2MtCO_2e, was traded on the CCX[18], supplemented by a confirmed 54.0MtCO_2e transacted in the OTC market.[19] This is a clear break from the past, as the OTC market has traditionally been responsible for the majority of voluntary transactions.

In 2008, the CCX grew 187% while the OTC market grew only 26%. This significant growth in CCX transactions is largely related to strong CCX trading activity and historically high CCX prices in Q1 and Q2 of 2008 on the back of the introduction of climate change legislation in the U.S. Congress.

In 2008, the volume-weighted average price of a voluntary carbon credit transacted on the OTC market was US$7.34/t$CO_2$e, up 20% from the average price of $6.10/t$CO_2$e in 2007 and almost doubling the price of $4.10/t$CO_2$e in 2006. Given the large variety of project types and diversity of buyers in the market, prices continued to range from as low as $1.20//t$CO_2$e to as high as $46.90/t$CO_2$e. On the CCX, prices soared to a high of $7.40/t$CO_2$e in June and subsequently crashed to a low of $0.95/t$CO_2$e in November. The average traded volume-weighted price on the exchange was $4.43/t$CO_2$e.

[18] CCX.
[19] The remaining 0.2 MtC02e was transacted via non-CCX exchanges.

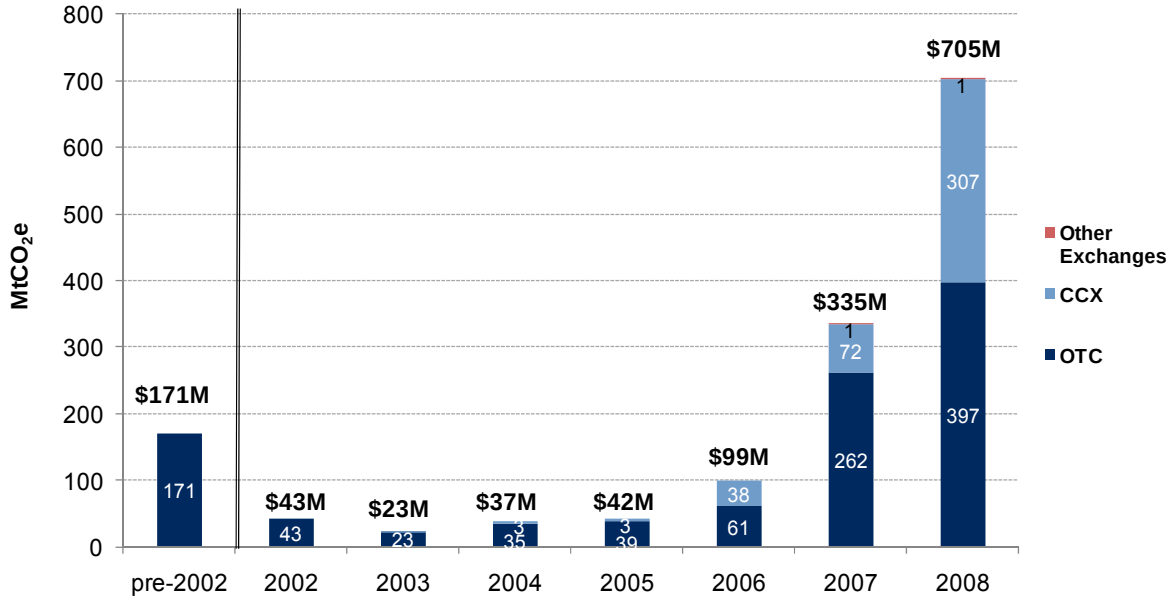
Figure 3: Historic Volume Growth in the Voluntary Carbon Markets[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 137 survey respondents

Using the volumes and prices stated above, we estimate the value of the voluntary carbon markets to be $705 million in 2008 (Figure 4), which represents more than a doubling (111% growth) in value from 2007, when the voluntary markets together transacted an estimated $335 million.

Figure 4: Historic Value Growth in the Voluntary Carbon Markets[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 137 survey respondents

Transactions on the CCX were valued at $307 million or 44% of the total voluntary market value, whereas the OTC market transacted $396 million, taking a 46% market share. Transactions occurring on other trading platforms such as the Asia Carbon

Exchange, Climex and the Australian Climate Exchange were valued at $1.6 million in 2008, up 161% since 2007 (at $640K). Although the transacted volumes were lower in the OTC market in 2008, its value is higher due to the average premium of 66% fetched by OTC credits relative to CCX credits.

In collection data on the voluntary OTC market for last year's report, we tracked 42.1MtCO_2e transacted in 2007 and 14.3MtCO_2e transacted in 2006. Because we have gained new survey participants each year, we are able to supplement our historic tracked transactions figures. Hence, as Table 1 shows, our volume figures for all years except 2003 have increased slightly to reflect this new data.

Table 1: New Voluntary OTC Market Volumes Recorded

Year	Transactions recorded in 2008 (MtCO_2e)	Transactions recorded in 2009 (MtCO_2e)	Change
2007	42.1	43.1	+1.0
2006	14.3	14.8	+0.5
2005	9.3	9.5	+0.2
2004	8.4	8.5	+0.1
2003	5.4	5.5	+0.1
2002	10.3	10.4	+0.1
Pre-2002	37.6	41.7	+4.1

Source: Ecosystem Marketplace, New Carbon Finance.

5.2 The Voluntary Markets in Context

In 2008 the international regulated markets transacted 4,090MtCO_2e, valued at $119,483 million (See Table 2). The voluntary markets remain only a small fraction (about 2.9% volume-wise, 0.6% value-wise) of the regulated markets. While it is clear that voluntary carbon markets alone will not achieve the scale needed to address climate change, the voluntary markets are not insignificant in size. For example, the voluntary OTC market alone is larger than the New South Wales, JI, and RGGI markets combined. Moreover, the voluntary markets' total growth rate of 86% was actually more than twice the regulated markets' growth rate of 40%.

Due to a mix of regulatory uncertainty and the financial crisis, carbon prices fell in late 2008 and CDM project development has slowed down, resulting in weakened transaction volumes and credit values in the EU ETS, primary CDM, and JI markets. Trading slowed to a near halt in the state of New South Wales, Australia in late 2008 and early 2009 amidst concern that the scheme would be eclipsed by the impending Australian market in 2010 (now delayed until 2011). The three exceptions to this trend of slowing-down regulatory markets are the secondary CDM, New South Wales, and Alberta SGER Schemes. Trading in the secondary CDM market took a leap in 2008, as fluctuating CDM prices made opportunities to profit, appealing to the financial firms that comprise the bulk of secondary CDM buyers, and the Alberta SGER market more than doubled in volume (and tripled in value). Data on the Regional Greenhouse Gas Initiative is only available for 2008, as actual trading only started in the summer of 2008.

Table 2: Transaction Volumes and Values, Global Carbon Market, 2007 and 2008

Markets	Volume ($MtCO_2e$)		Value (US$ million)	
	2007	2008	2007	2008
Voluntary OTC	43.1	54.2	262.9	396.7
CCX	22.9	69.2	72.4	306.7
Other exchanges	0	0.2	0	1.3
Total Voluntary Markets	**66.0**	**123.4**	**335.3**	**704.8**
EU ETS	2,061.0	2,982.0	50,097.0	94,971.7
Primary CDM	551.0	400.3	7,426.0	6,118.2
Secondary CDM	240.0	622.4	5,451.0	15,584.5
Joint Implementation	41.0	8.0	499.0	2,339.8
Kyoto [AAU]	0.0	16.0	0.0	177.1
New South Wales	25.0	30.6	224.0	151.9
RGGI	-	27.4	-	108.9
Alberta's SGER[(a)]	1.5	3.3	13.7	31.3
Total Regulated Markets	**2,919.5**	**4,090.0**	**63,710.7**	**119,483.4**
Total Global Markets	**2,985.5**	**4,213.4**	**64,046.0**	**120,189.0**

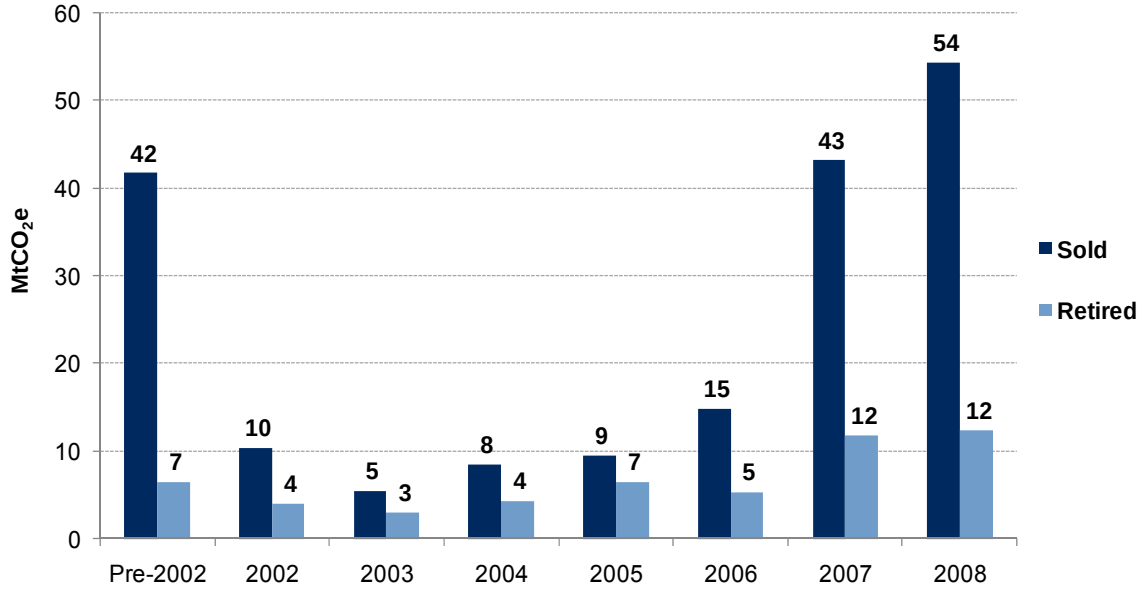
Source: Ecosystem Marketplace, New Carbon Finance. Notes: (a) Assume a CA$10 price for Alberta offsets and Emission Performance Credits, based on interviews with market participants.

5.3 Retirement: The End Goal

A carbon credit in the voluntary market does not fulfill its life's goal of offsetting another GHG emission until it is "retired" by a supplier or final buyer. When an entity purchases carbon credits to offset its emissions, the carbon credit must be retired and cannot be sold again. Retirement is critical in the voluntary markets because it represents the impact of the market from an environmental perspective and relates to the fundamental demand in the market for offsetting GHG emissions. Hence in our survey, we also tracked the volume of credits retired for customers. Of the 169 survey respondents, we accounted for retired credits from 75 entities (44%).

In 2008, a mere 12$MtCO_2$ were reportedly retired by voluntary buyers (Figure 5). As 45% of the transactions are related to future vintages beyond 2008 (see Section 6.5.1), these transactions would not have resulted in retirement, as the emissions reductions have not yet occurred. However, the number is still expected to be an underestimate as many buyers and brokers cannot confirm the fate of credits sold. For example, in response to another survey question regarding customer motivations, suppliers noted that 34% of OTC credits sold to voluntary buyers were retired (see Section 10.1). Using this percentage figure, we can derive that a possible 14.2$MtCO_2$ were actually retired in 2008, more than 50% of tracked credits that are eligible for retirement. An additional 28% did not know the final destination of the credits they sold.

Figure 5: Historic Transaction Volumes on the OTC Market and Retired Volumes[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 137 survey respondents

Before 2006, a transaction in the OTC marketplace was almost synonymous with retirement. However, as more intermediaries have entered the market, the number of times that a credit is transacted has increased from an average of 1.8 during the period 2002-2005 to more than 4.4 in 2008. This concept of the number of times a credit "passes hands" before it is retired is commonly called the *churn rate*. The 2008 churn rate represents roughly one more transaction per emissions reduction than the 2007 churn rate of 3.9, and between one and two more transactions per emissions reduction than the 2006 churn rate of 3.0. Based on suppliers' responses that at least 34% of credits transacted were retired, the 2008 churn rate would more likely be 2.9.

5.4 Varied Vendors: Suppliers in the Market

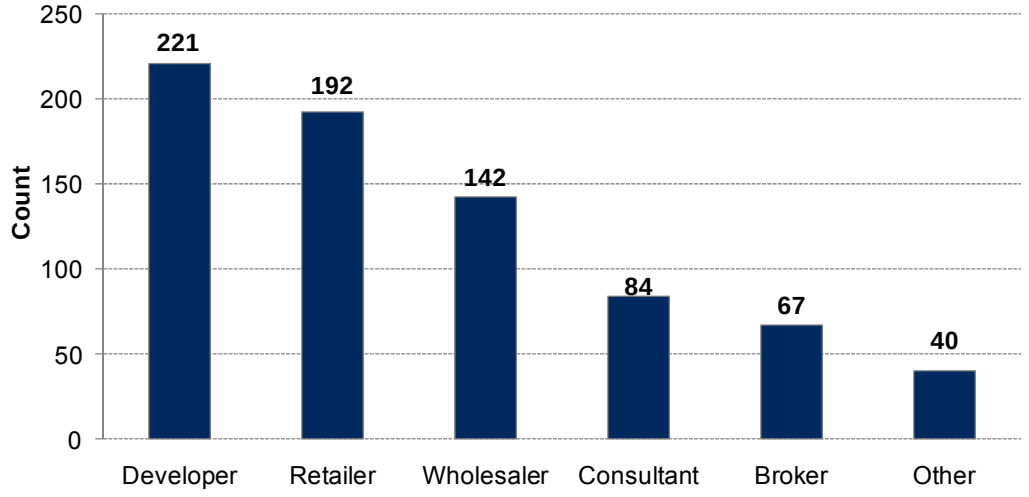
As the buzz around the voluntary carbon markets has risen, the number of suppliers offering wares to voluntary buyers has also continued to multiply. Suppliers can operate at several levels in the value chain.

We asked suppliers to specify their role in the value chain. Because many organizations wear several hats, respondents had the option to check an unlimited number of business activities that they perform. Note that this is different from last year, when respondents were required to identify their primary and secondary business activity. The options were: retailer, wholesaler/aggregator, broker, project developer, consultant, and other (see Section 3 for definitions). Respondents selecting "other" described themselves as hedge funds, investment banks, facilitators, NGOs, and several other business types.

Figure 6 illustrates the total number of organizations operating in each business category. The total number of organizations across the supply chain exceeds the number of survey respondents and the number of suppliers that exist because respondents could tick more than one of the boxes and because we incorporated data

from suppliers still in existence that participated in the survey last year but not this year. As expected and similar to previous years, the number of companies operating as project developers and/or retailers is larger than any of the other categories. Brokers constitute the smallest group, as this category is generally dominated by a few large companies.

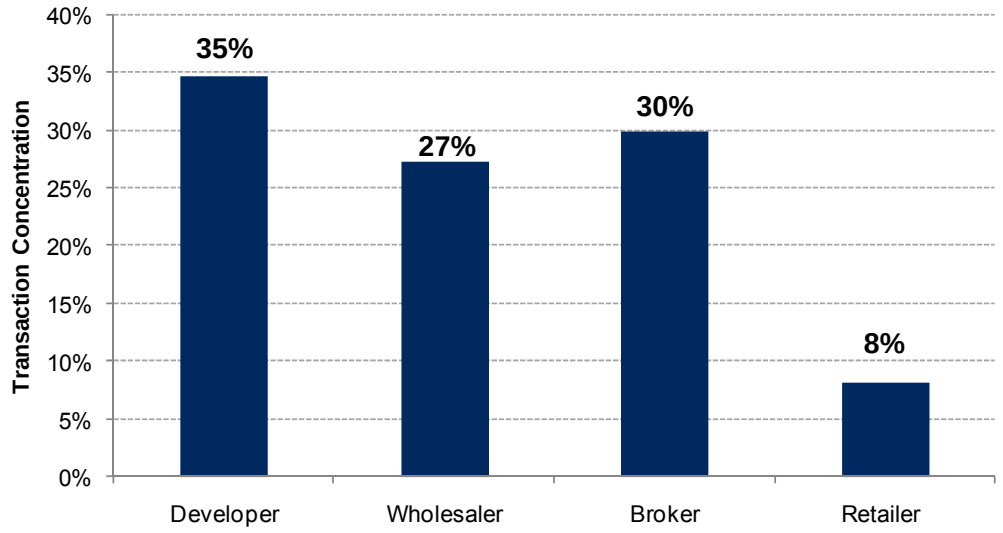
Figure 6: Cumulative Suppliers by Self-Categorized Business Activity, Aggregated Over Survey Years 2006-2008[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 746 observations

Figure 7 illustrates the market share of transaction volume by respondents' business activity.

Figure 7: Transaction Concentration by Respondent Business Activity, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 137 survey respondents

Transaction concentrations were more evenly dispersed across the developer (35%), wholesaler (27%), and broker (30%) categories than they were in 2007, while retailers'

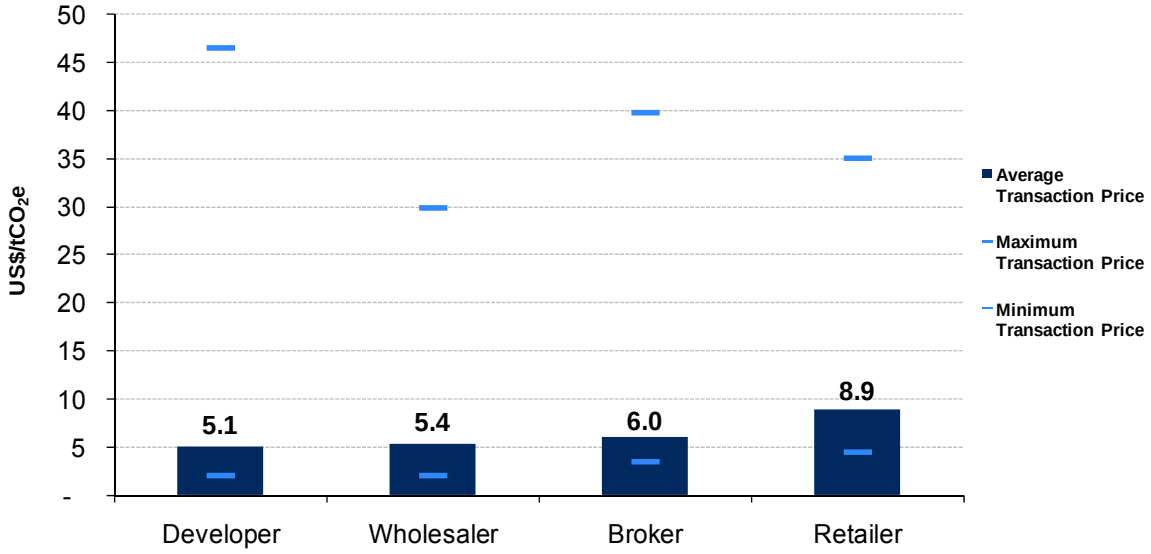
share of the market (8%) remained about the same as in 2007. The small contribution of retailers in terms of transaction volume is explained by the fact that the average transaction they perform is very small relative to project developers, wholesalers, and brokers.

5.5 Prices by Supplier Business Activity

Utilizing volume-weighted price and business activity data, we derived the average selling price in 2008 by supplier business function (see Figure 8), including the minimum and maximum prices as indicated by respondents.

A general price increase is reflected across the supply chain and is consistent with previous years. Not surprisingly given the reduced transaction size across the value chain, the least expensive credits come directly from project developers, and the most expensive credits are sold by retailers. Brokers facilitate transactions between developers/wholesalers and other parts of the value chain (including final buyers) and therefore report prices higher than those reported by developers.

Figure 8: Credit Price Average and Range by Respondent Business Category[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 137 survey respondents

Since we have changed the survey methodology and did not ask for an entity's *primary* business category this year, it is difficult to directly compare these results with last year's. However, we can make some broad observations. The average selling price increases from \$5.10/tCO_2e for developers to \$5.40/tCO_2e for wholesalers and to \$6.00/tCO_2e for brokers. This is largely in line with last year's results, although the relative positions of wholesalers and brokers in the price spectrum have reversed, which is most likely due to the change in methodology. The average retailer price decreased from \$11.30/tCO_2e in 2007 to \$8.90/tCO_2e this year. We believe this is due to more companies' defining themselves as retailers this year, even though they sell credits in larger volumes, which typically fetch lower prices than smaller-volume sales. In fact, transaction size is by far the most significant price determinant of voluntary offsets.[20]

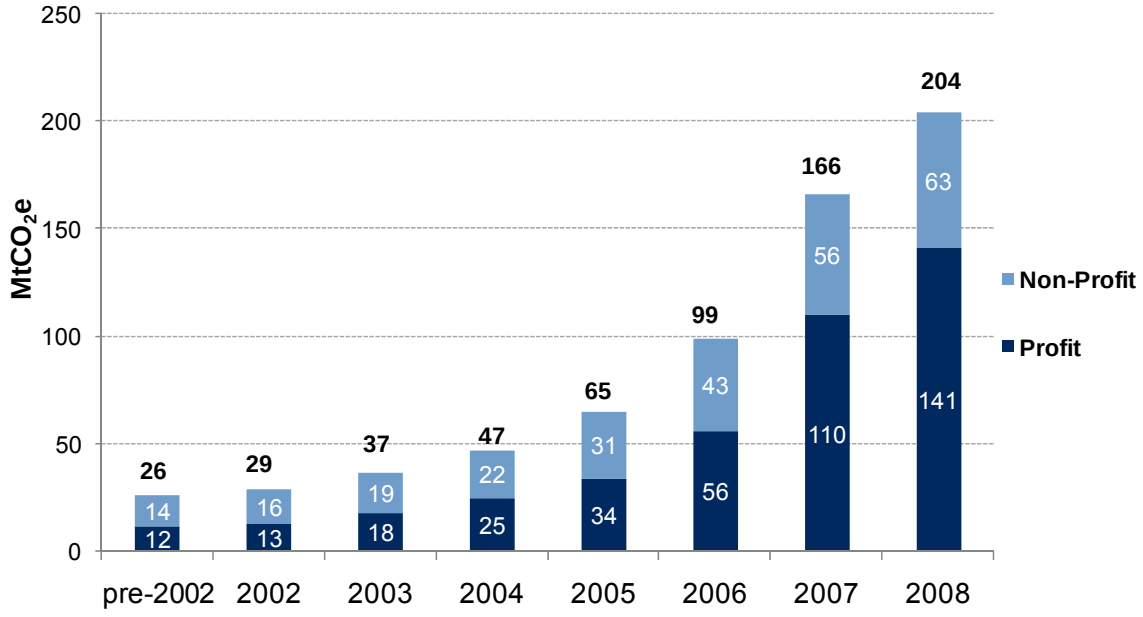
[20] Statistically significant beyond the .01 α level.

5.6 Non- Profit vs. For-profit Suppliers

As a market driven by entities choosing to minimize their climate impact on their own accord, the voluntary carbon market straddles the realm between philanthropy and commodity. In this arena, both non-profit and for-profit organizations supply carbon offsets. While non-profit organizations were the pioneer voluntary offset suppliers, since 2006 they have been significantly outnumbered by private firms and their share of the transaction volume has dwindled.

Of the 204 organizations who specified their profit status in this and last year's survey, the vast majority (69%) were for-profit companies (see Figure 9). This is roughly the same share of the supplier market they occupied of the supplier market last year (66%). The increasing dominance of for-profit firms in the voluntary markets is even further demonstrated by the share of total transaction volume that was made by for-profit firms (93%). Non-profits accounted for only 7% of transaction volume in 2008, down from 11% in 2007 and 34% in 2006.

Figure 9: Cumulative Suppliers by Profit vs. Non-Profit Organization Type, Aggregated Over Survey Years 2006-2008[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 204 survey respondents

Overall, non-profits were only slightly more likely to confirm credits retired than for-profit organizations. Of the 12MtCO_2 we tracked as retired in 2008, 8.8MtCO_2 (71%) were confirmed by private organizations vs. 3.5MtCO_2 (28%) by non-profit organizations. The consistent increase in the share transaction volume supplied by for-profit companies reflects the bullish growth of the voluntary markets in the last several years and the heightened opportunities for profit-making—not only from "pure" voluntary buyers, but increasingly from pre-compliance voluntary buyers.

6 Origin of an Offset

Summary Points:

- In the OTC market of 2008, renewable energy projects grabbed most market share, with hydro and wind capturing 32% and 15% of the transaction volume respectively. The dominance of this project type comes from its appeal to voluntary buyers and high credit production from Turkish VER projects and Asian pre-registered CDM projects.
- Landfill was the second most popular category, capturing 18% of the market (from 5% in 2007), mostly resulting from a shift towards pre-compliance motives in the U.S. carbon market. In contrast, energy efficiency, fuel switching, and coal mine methane all declined in popularity.
- Similar to 2007, both Asia and the U.S. dominated offset project locations with transaction shares of 45% and 28% respectively. The Middle East suddenly came on the map, contributing 15% of credits as a result of a few large projects in Turkey and Egypt. Credits from the EU, Canada, Australia, and New Zealand declined significantly with the coming into force of the Kyoto Protocol and the resulting issue of double-counting.
- Project type was again one of the most significant factors influencing price. The highest average prices were obtained by solar ($21.98/t$CO_2$e) and biomass renewable energy projects ($16.84/t$CO_2$e). The credits with lowest average prices originated from geological sequestration ($2.58/t$CO_2$e), agricultural soil ($3.35/tCO_2e), and industrial gas projects ($4.57/t$CO_2$e).

With the exception of CCX credits or those retired from the regulated market, all credits in the voluntary OTC market originate from offset projects. Offset projects are spread across the globe and vary from industrial gas destruction to forest conservation to hydro power. Compared to the CCX or the regulated markets where buyers are seeking a simple commoditized GHG reduction, one major unique theme for the OTC voluntary carbon markets is the emphasis on the story behind the credit.

The following section is focused on where OTC credits came from: the project type, location, size, and vintage as well as financing structures to deliver the credits. In addition to collecting data on the OTC market, we also collected a limited amount of data on the CCX. It is important to note that the information we have on these credits does not reflect their transactions. Once an offset credit becomes a CCX credit, known as a Certified Financial Instrument (CFI), it is no longer identifiable as an offset-based or allowance-based credit, and thus tracking transactions of offset-based CFIs is difficult.

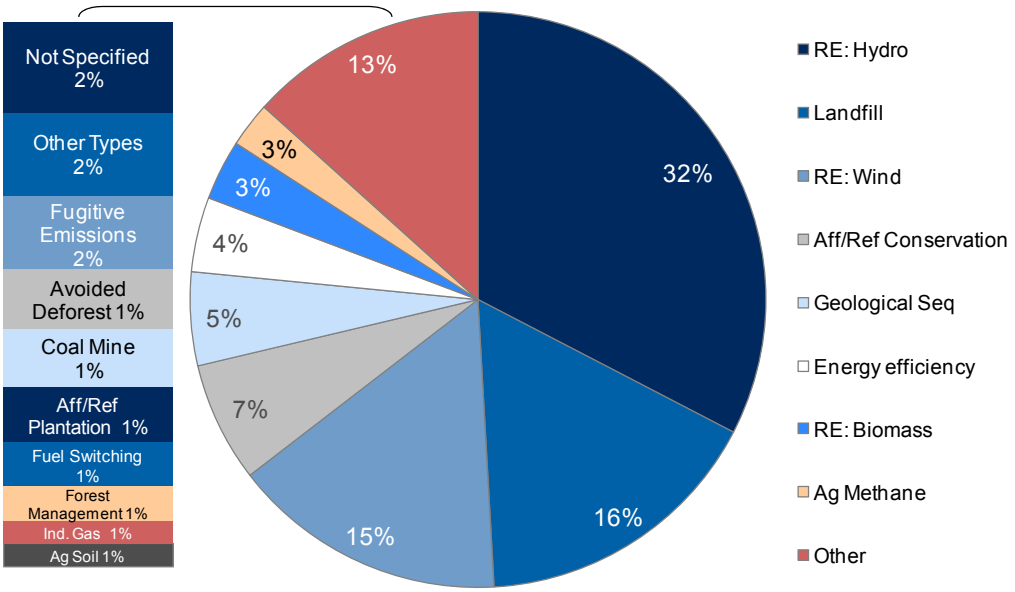
6.1 From Wetlands to Wind Farms: OTC Project Types

In 2008, the popularity of projects selling credits into the OTC market was driven by factors on both the supply and demand sides of the equation. On the supply side, the availability of certain types of credits was key in shaping the market. For example, the CDM registration bottleneck was a major reason why credit types were available for the voluntary market. At the same time, over half of credits were sourced from outside the CDM pipeline. On the buy side, several forces shaped demand: the desire from pure voluntary buyers for appealing but non-controversial project types; entities building portfolios of credits that could be eligible under a U.S. regulatory cap-and-trade system;

and a preference from both pre-compliance and many pure voluntary buyers for credits verified to third-party standards.

As depicted in Figure 10, overall renewable energy projects dominated the OTC market last year, representing 51% of the transaction volume. The top three project types by market share were hydropower (32%), landfill gas (17%), and wind (15%). The remaining one-third of the transaction volume was shared between more than fourteen different technologies.

Figure 10: Transaction Volume by Project Type, OTC 2008[1]

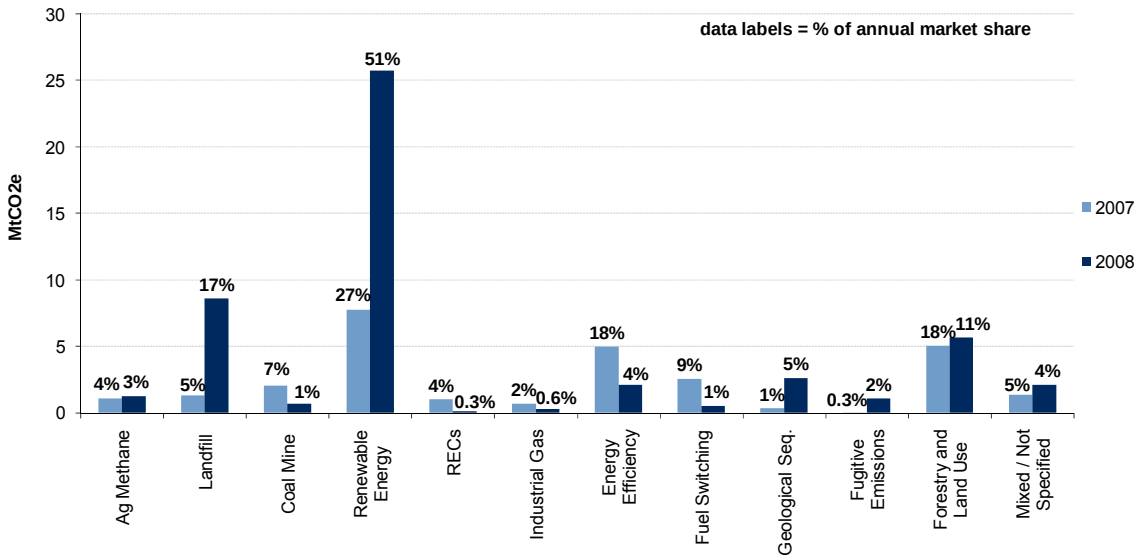


Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 335 observations

Figure 11 illustrates that the project types gaining most market share between 2007 and 2008 were hydro projects (denoted as RE: Hydro in the figures), which increased from 27% to 51% of OTC market share (7.8 to 26MtCO_2e); landfill gas, which increased from 5% to 17% of OTC market share (1.3 to 8.3MtCO_2e); and geological sequestration, which increased from 1% to 5% of market share (0.3 to 2.6MtCO_2e). Losing most market share were energy efficiency projects, which dropped from 18% to 4% of the OTC market (5.0 to 2.1MtCO_2e); fuel switching, from 9% to 1% of the market (2.6 to 0.4MtCO_2e); and coal mine methane, from 7% to 1% (2 to 0.7MtCO_2e).

Because voluntary market transaction volumes are relatively small, changes in projects' market share between consecutive years are often due to a couple of large deals undertaken, as these easily swing the balance to an extreme. For example, excluding one confirmed bulk transaction of hydropower from our calculations would reduce the 2008 market share of renewable energy projects by 18 percentage points (from 51% to 33%). Therefore, when evaluating the popularity of project types, market share between years is only one piece of the puzzle.

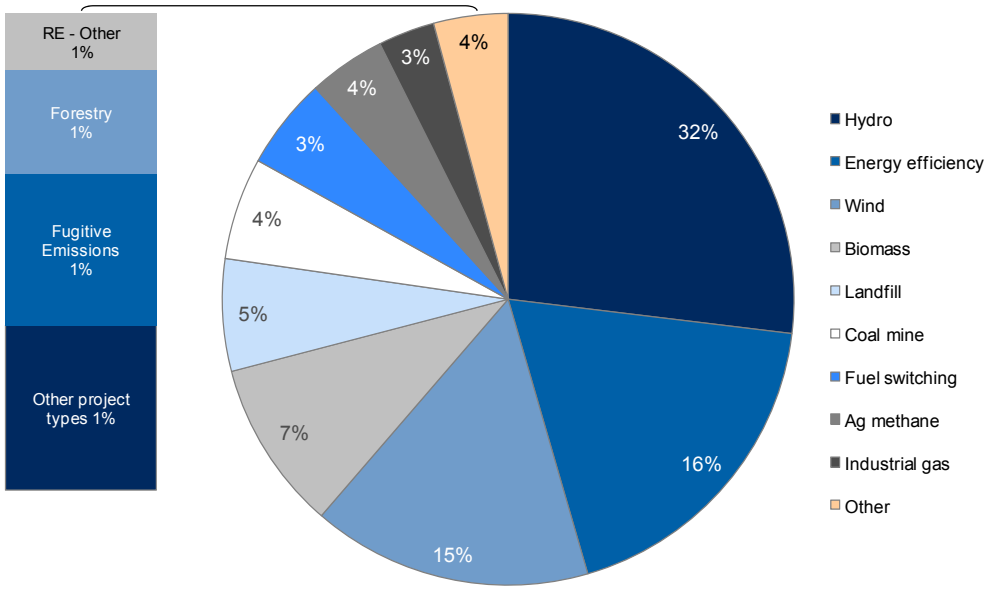
Figure 11: Transaction Volume by Project Type, OTC 2007 vs. 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) 2008 figures based on 335 observations

As noted earlier, credit-sourcing patterns from the regulated markets and especially the CDM are a major influence on the voluntary carbon markets, since a significant number of projects selling VERs are awaiting registration to be able to sell CERs. Figure 12 illustrates projects proposed to the UNFCCC in 2008.

Figure 12: CDM/JI Volume by Type of Projects Introduced in 2008



Source: Ecosystem Marketplace, New Carbon Finance.

Not surprisingly, hydro power projects are popular within the CDM, which coincides with the considerable number of this project type selling VERs. Alternatively, the greater percentage of landfill methane and geological sequestration projects sold in the OTC market highlights the point that the majority of these projects are based in North America. One disconnect is the number of energy efficiency projects proposed to the CDM in 2008 and the drop of energy efficiency credits transacted in the OTC voluntary market.

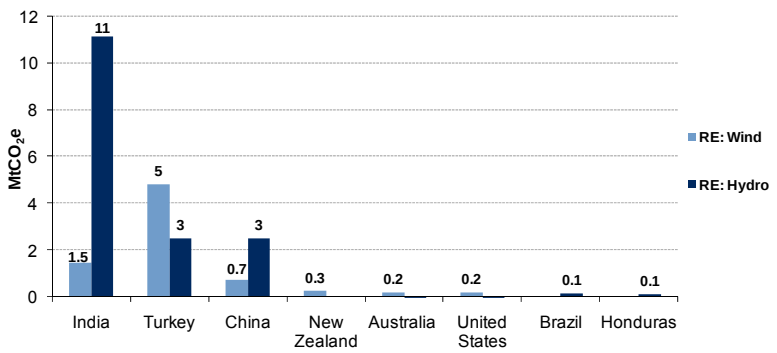
6.1.1 Renewable Energy: Powering Up

Renewable energy projects supplied the majority (51% or 26MtCO_2e) of credits transacted in the OTC market in 2008. In particular, hydropower projects sourced more than half the renewable power-based VERs, a huge batch of which came from a 9Mt single confirmed transaction–likely the largest VER transaction ever, as it comprises 35% of renewable energy offsets sold to voluntary buyers in 2008.[21] Hydropower was behind the Middle East's ascension to "power player" status in the voluntary markets (at least in terms of transaction volume) where most VERs came from Turkish hydropower projects. Figure 13 gives the location of wind and hydro deals in 2008.

Credits from wind power also blew in as a popular project type in 2008, capturing 15% (7.7MtCO_2e) of transaction volume. The majority of wind-powered VERs (63%) also originated in Turkey, which ratified the Kyoto Protocol in 2009 but is not in a position to host CDM or JI projects. India was also a major player with 19% of wind credits.

Solar beamed in at a distant third among the renewable energy project types, sourcing less than 0.1% of the OTC market's total transaction volume (14,000tCO_2e). Its small share of the renewable energy VER market is not surprising, given its relatively high production costs and small average project size.

Figure 13: Wind and Hydropower VER Volume by Project Location, OTC 2008



Source: Ecosystem Marketplace, New Carbon Finance.

As was the case in previous years, the popularity of renewable energy projects can be partially attributed to its appeal to pure voluntary buyers, who generally view them as relatively non-controversial, easy to understand, and a long-term alternative to fossil-fuel based power. At the same time, many large renewable energy projects generate relatively inexpensive credits, which, several suppliers pointed out, have become particularly desirable in the midst of the financial crisis. Edward Weinberg, Vice President of Caspervandertak Consulting USA,

[21] Times of India Mumbai 18 Feb. 2009; Sec: Times Business, p. 24 http://epaper.timesofindia.com/Repository/ml.asp?Ref=VE9JTS8yMDA5LzAyLzE4I0FyMDI0MDA=&Mode=HTML&Locale=english-skin-custom.

describes small-scale renewable energy projects as relatively "cute and huggable", and charismatic compared to industrial gas or energy efficiency projects. However, others disagree and say the renewable energy arena is not without criticism. Large hydro projects in particular have been the target criticism around their additionality and detrimental environmental impacts.

In addition, one of the more complicated, heated debates in the voluntary carbon markets (mostly in the U.S.) has been the issue of converting Renewable Energy Certificates (RECs) into carbon offsets. The REC market operates separately from the carbon markets in places such as the U.S., Canada, Europe, and Australia. Also referred to as Tradable Renewable Energy Certificates (TRECs) or Green Tags, RECs are tradable certificates representing the environmental attributes from the generation of one kilowatt-hour (kWh) of on-grid renewable energy. Like carbon offsets generated from renewable energy projects, they are a separate commodity from the power itself and exist in both regulated and voluntary markets.

RECs are traditionally sold on a per-megawatt-hour (MWh) basis, but are sometimes converted into tonnes of carbon dioxide avoided (tCO_2e) and sold into the voluntary carbon markets as carbon offsets. The controversy that exists around the validity of RECs as offsets centers on the accuracy of conversion calculations, as well as different market additionality and ownership questions. The Green-e Climate Standard is one standard designed to deal with the issue by including specialized requirements for RECs as offsets.

In order to track RECs sold as carbon offsets, we collected data from REC suppliers who advertised or provided clear disclosure that their RECs were converted into carbon offsets. Our analysis therefore is meant only to include RECs sold as tCO_2e. If a utility chose to sell carbon offsets instead of RECs, then the source of supply would fit in the general renewable energy category. Since a desire to reduce greenhouse gas emissions is a key driver behind the green power market, drawing a line in the marketing sand was difficult for many providers.

This year's findings point to a continued decline in the number of RECs sold as carbon credits with only $0.14MtCO_2e$ transacted relative to $1MtCO_2e$ in 2007. It should be noted, however, that this year we specifically asked for U.S.-based RECs whereas previous years there was no geography limitation. Even compared to U.S.-only RECs, a decline was observed (from 0.32 to $0.14MtCO_2e$). This number is roughly consistent with the National Renewable Energy Lab's (NREL) soon to be released in the U.S. green power market status report. Surveying U.S.-based renewable energy providers, NREL found about 210,000 RECs converted into carbon offsets. Most of these offsets were certified to Green-e Climate. Additionally, pre-compliance REC activity may also explain the decline in REC sales on the offset market, as utilities start hedging against the future risk of a federal Renewable Portfolio Standard.

This decrease in market share should not, however, reflect a decrease in growth of the voluntary REC or green power market. According to the National Renewable Energy Lab (NREL), U.S. voluntary REC sales increased between 2005 and 2008.

6.1.2 Methane: One Man's Trash…

After renewable energy projects, methane destruction was the second most popular project type transacted in the OTC market in 2008. Landfill gas projects took the lead, claiming 17% of the global OTC market, up from only 5% in 2007. Agricultural methane represented a distant second with 3% market share (down from 4%), and coal mine methane projects sourced 1% of credits transacted (down from 7%).

Numerous factors contributed to the rise of methane reduction projects in the voluntary marketplace. First, quantifying emissions avoided via methane projects are relatively established as mature and commercially deployable technology exists for clearly defined project types. Second, because of methane's high global warming potential (23 times that of carbon dioxide per molecule), methane-based carbon credits are also relatively inexpensive to generate.

Furthermore, most transacted VERs in this category were originated in the U.S. where a federal cap-and-trade market is expected to come into existence in which methane projects are likely to be eligible for compliance at least in the early stages. Hence, these projects are often considered good pre-compliance plays. This is further evidenced by the fact that most of these projects were or plan to be verified to the Climate Action Reserve (CAR), which is considered the premiere pre-compliance offset standard. In 2008, 43% of landfill-based credits and 56% of livestock credits tracked were verified to CAR's protocols.

6.1.3 Gaining (Under)Ground: Geological Sequestration

Gaining traction in 2008 was geological sequestration, which rose in share from 1% (0.4MtCO_2e) of the OTC transaction volume in 2007 to 5% (2.6MtCO_2e) in 2008. The increased popularity of this project type may be linked to the huge potential supply and low cost. In the United States, all of this volume was generated from Enhanced Oil Recovery (EOR) projects with more than half of it registered on the American Carbon Registry. According to Lauren Kimble of project development firm Blue Source, the ACR is one of the only registries accepting credits from this project type.

6.1.4 Terrestrial Carbon Sequestration: On Solid Ground

Over the last decade, land-based, carbon sequestration projects, especially from forestry, have gone from a mainstay of the market to a habitat for debate. Some of the first carbon offsets were generated via reforestation, and this project type dominated the market for voluntary offsets until 2004. Throughout the past five years, new entities have continued to develop forest-based carbon projects. However, as the voluntary carbon markets have diversified into other project types and buyer preferences, the forestry market's share of transactions has continued to decrease.

In 2004, we tracked 3.3MtCO_2e of land-based credits transacted on the OTC markets. By 2007, this number had increased to 5.0MtCO_2e, while its market share decreased to 16% (from 29%). In 2008, the overall volume of forestry-based VERs transacted in the OTC market increased to 5.7MtCO_2e, although its market share fell to 11%. The decrease in forestry's dominance is a result of the same issues that have kept forestry and other land-based projects from playing a major role in the Kyoto markets—issues such as permanence, leakage, and accounting uncertainty. However, barriers in the CDM have also meant that the voluntary markets have uniquely fertile ground for land-

based projects. In the past two years, the tide has turned for forests as stakeholders seeking a means of halting rapid deforestation have begun to aggressively influence policy and markets to incentivize avoided deforestation, also known as Reduced Emissions from Deforestation and Degradation (REDD).

Table 3: Land-Based Credits Sold in OTC, 2007 vs. 2008[22]

Project Type	Volumes of land-based credits ($ktCO_2e$)		Market share of land-based credits relative to the total	
	2007	2008	2007	2008
Aff./Reforestation Mix	673	646	2%	1%
Aff./Reforestation Mono	2,157	3,399	8%	7%
Avoided Deforestation (REDD)	1,421	730	5%	1%
Forestry Management	-	431	-	1%
Agricultural Soil	820	267	1%	0.5%
Other Land-based projects	-	130	-	0.3%
Total	**5,071**	**5,603**	**16%**	**11%**

Source: Ecosystem Marketplace and New Carbon Finance.

Changing attitudes about land-based credits may be influencing investment in forests but did not lead to an increase of land-based credits transacted. A recent study conducted by EcoSecurities, Conservation International, the Climate, Community and Biodiversity Alliance, and ClimateBiz.com surveyed corporate buyers on their attitudes toward carbon offsets from forestry projects. It reported that around 90% of respondents view avoided deforestation and native tree reforestation projects as the most desirable forestry projects, followed by agro-forestry (81%) and peat land conservation (75%). Despite such positive sentiments towards REDD and the fact that the only market for REDD is currently the voluntary market, REDD credits declined from 1.4$MtCO_2e$ in 2007 to 0.7$MtCO_2e$ in 2008.

Project developers cite a variety of difficulties as hurdles for REDD projects. Chris Tuite of Conservation International identified a bottleneck in the development of REDD projects that is not likely to widen for the next 12-18 months. “Because of the nature of these projects, developers are finding that they are not that easy to develop, in that there is a whole layer of complexity in relation to working with communities, mid-levels of government, national governments, the policies and regulations around carbon ownership, and of course the technical issues around measuring carbon.” Also contributing to the supply bottleneck are regulatory uncertainty and the limited availability of approved REDD methodologies as hurdles for REDD projects.

The topic of peat land conservation generated much discussion in 2008, but we were unable to track any credits transferred. However, this pattern of lower transaction volume from land-use projects may change since forestry and agricultural projects are highly likely to be accepted in a U.S.-based cap-and-trade system. Both last year’s Lieberman-Warner bill and the current draft of the Waxman-Markey proposal specifically accept

[22] The Ecosystem Marketplace Forest Carbon Portal has tracked 25 forestry projects currently selling credits into the OTC market.

offset credits from forestry projects. If the final design of a U.S. cap-and-trade scheme permits both domestic and international forestry offsets, its share of OTC transaction volumes is expected to grow again.

Between 2008 and 2007, the number of OTC transactions (and CCX registrations) of soil carbon credits also decreased. Over the past several years this project type has mostly lived in the CCX. However, if the agricultural sector influences a U.S. cap and trade bill the grass may become greener for this project type in the OTC market as well. Viewing soil carbon as a potential offset project type for the regulated markets, numerous groups are developing new methodologies for soil carbon. Ellysar Baroudy, head of the World Bank's BioCarbon Fund– one of the organizations developing a methodology for forest soil carbon– emphasized, "The issue with soil carbon is not the project type itself but with the methodologies for developing soil carbon credits. These must be robust but also simple to apply and cost-effective".

6.1.5 CCX Project Type: A Big Year for Forestry, Renewables

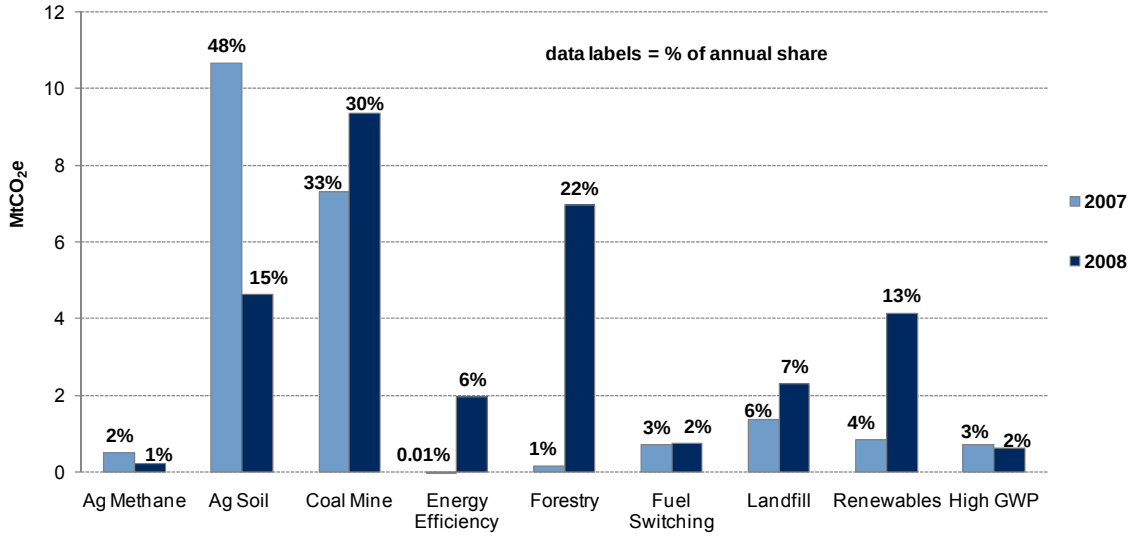
In 2008, offset project developers were eligible to generate CFIs from eight general project categories: agricultural methane, landfill methane, coal mine methane, agricultural soil carbon, rangeland soil carbon management, forestry, renewable energy, and ozone depleting substance destruction. The CCX also approves other project types, such as energy efficiency and fuel switching, on a case by case basis.

As Figure 14 shows, forestry, energy efficiency, and renewable energy projects experienced a strong increase in the number of offsets registered on the CCX in 2008. The largest growth in registered offsets of any project type was by forestry, which registered only 0.2MtCO_2e in 2007 but generated 7.0MtCO_2e in 2008. Murali Kanakasabai, a Vice President and Senior Economist at the CCX, attributes this jump in forestry-based CFIs to several major structural changes to the exchange's rules for forestry project eligibility and verification processes. In 2008, the CCX added four new forestry project protocols (for afforestation, improved forest management, long-lived wood products, and REDD); refined existing protocols; expanded the list of approved third-party verifiers; and expanded its Forestry Committee, which Kanakasabai says "helped provide required expertise in evaluating projects for approval."

Energy efficiency projects supplied nearly 2MtCO_2e of CCX offsets in 2008, up from a negligible amount in 2007. Renewable energy projects supplied 4.1MtCO_2e of registered offsets in 2008, a 410% growth over their 2007 volume of 0.8MtCO_2e and a trend consistent with the surge in transaction volume of renewable energy projects in the OTC market (see Figure 14). Eligible renewable energy projects include wind, which was the most popular source of offsets, and solar. Coal mine methane projects, which are generally much larger projects than agricultural methane projects, remained a major source of registered offsets in 2008.

In contrast to the above-mentioned types, agricultural soil offsets fell by more than half, to 4.7MtCO_2e, relative to their registered volume in 2007 (10.7MtCO_2e). According to Nathan Clark, this decrease is likely due to modifications in the agricultural soil protocol, which eliminates the eligibility of new agricultural soil projects from Canada and has potentially led to verification delays. "As the program grew, verification took longer, and verification reports were submitted later, thus pushing some of the registrations into 2009."

Figure 14: CCX-Registered Offsets by Project Type, 2007 vs. 2008



Source: Chicago Climate Exchange.

6.1.6 The Costs of Cutting Carbon: Prices by OTC Project Type

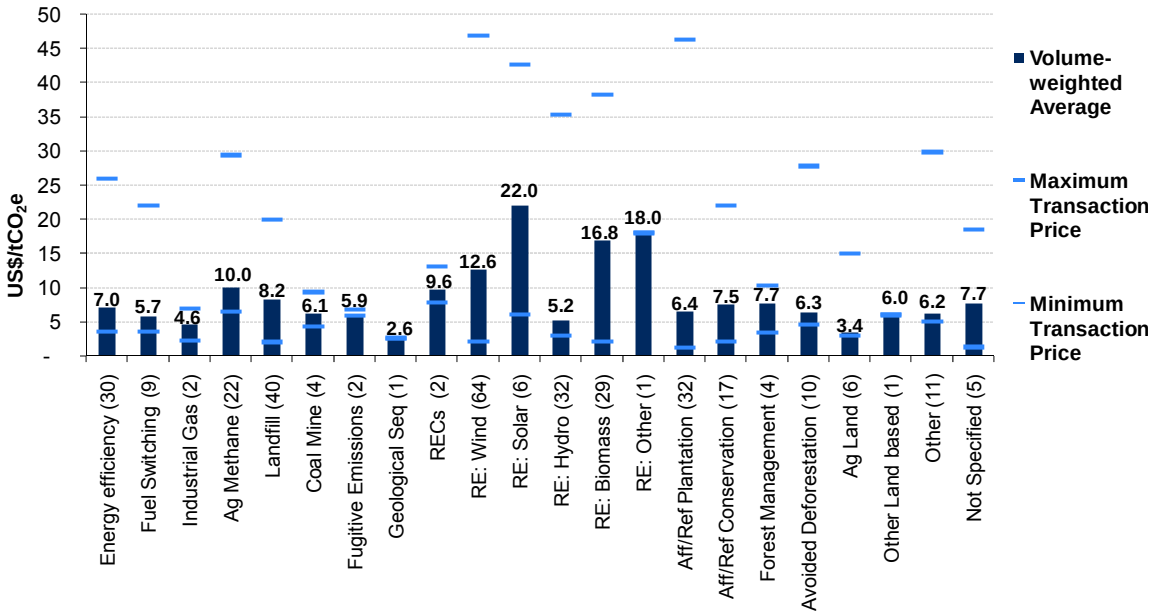
Other than transaction volume, prices also differ significantly by project type. The difference in credit prices reflects many factors including the heterogeneity of abatement costs; the desirability of particular project types to different buyers; at what stage in a credit's life it was sold; and a range of optional features including utilizing third-party standards and registries. For instance, solar VERs often sell for higher prices because they have high production costs, whereas industrial gas credits are relatively inexpensive to produce their fixed costs and are often financed via a means other than carbon finance. As another example, credits purchased directly from project developers are often cheaper than credits purchased from retailers (see Section 5.5), as transaction costs increase each time a credit changes hands. Additionally, credit prices also reflect a buyer's assignment of extra financial value to certain co-benefits conferred by an offset beyond an emissions reduction, such as biodiversity, cultural, or community economic benefits.

Overall, price trends by project types were very similar to those observed in 2007. The four highest-earning (by average credit price) project types on the market last year were all renewable energy activities: solar ($21.98/t$CO_2$e), geothermal ($18.00/tCO_2e), biomass ($16.80/t$CO_2$e), and wind ($12.61/tCO_2e). These project types earn high credit prices because of their high costs of production and appeal to voluntary market buyers. Agricultural methane projects also fetched a high average price ($10/t$CO_2$e), largely because of their appeal to pre-compliance buyers and the fact that 56% of these offsets were verified to the Climate Action Reserve Protocols, which have been pegged as high-quality and pre-compliance protocols.

On the other end of the price spectrum (see Figure 15), geological sequestration credits earned an average of $2.58/t$CO_2$e; agricultural soil credits $3.35/t$CO_2$e; and industrial gas credits $4.57/t$CO_2$e. Geological sequestration credits consistently sell for low prices because they are generated from Enhanced Oil Recovery (EOR), a sequestration

method that already gets revenues from the additional production of crude oil and can therefore produce emissions reductions at very low cost. Industrial gas credits sell for low prices because of their low cost of production; the most common industrial gases are hundreds to thousand times more potent than carbon dioxide in terms of Global Warming Potential (GWP) and are relatively cheap to mitigate. Agricultural soil credits have been hampered by additionality and permanency, which, combined with their low cost of production and low appeal in the voluntary market, has consistently resulted in low credit prices. Additionally, 96% of the agricultural soil offsets we tracked in the OTC market originated from the CCX, which may also help explain the below-average prices for this project type.

Figure 15: Credit Price Ranges and Averages by Project Type, OTC 2008[1]

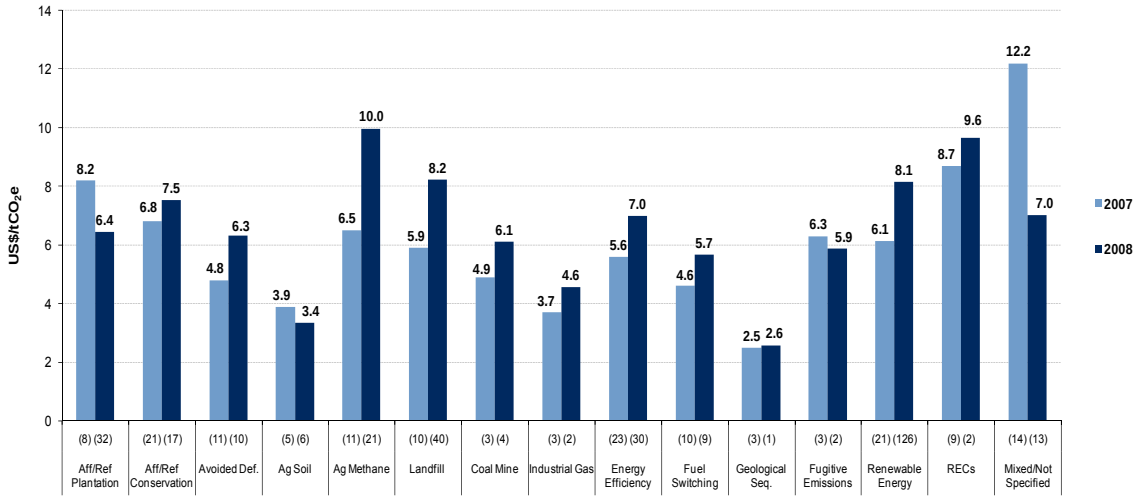


Source: Ecosystem Marketplace, New Carbon Finance. (1)Based on 330 observations

Note: Numbers within parentheses indicate number of observations.

Comparing average OTC prices between 2007 and 2008, Figure 16 reveals an overall increase in credit prices for most project types (11 out of 14 specified below, excluding the "mixed/not specified" category). In general, methane destruction project types enjoyed the greatest price increases of all project types, most likely related to the standards endorsing these project types and their pre-compliance positioning. Agricultural methane credit prices grew by 54%; landfill methane by 39%; and coal mine methane by 24%. Renewable energy offsets increased by 33%, and although avoided deforestation declined in transaction volume, the few transactions that were done increased in price by 31%. The only three project types that did not experience a growth in average credit price were afforestation/reforestation plantation (-28%), agricultural soil (-15%), and fugitive emissions (-7%).

Figure 16: Average Credit Prices by Project Type, OTC 2007 vs. 2008[1]

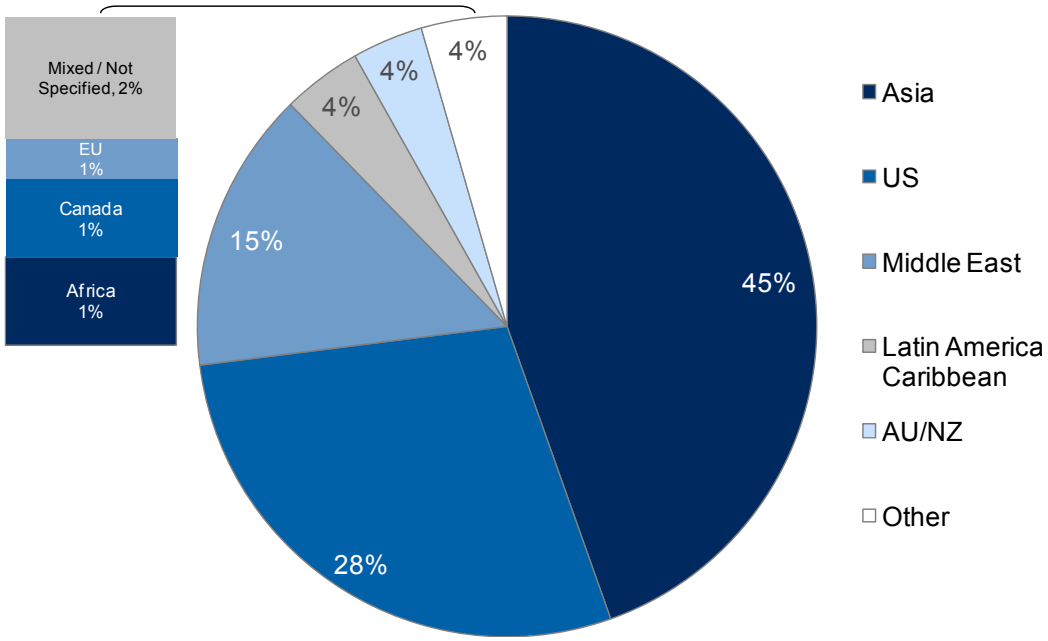


Source: Ecosystem Marketplace, New Carbon Finance. (1) 2008 figures based on 330 observations

6.2 From Texas to Turkey: OTC Project Locations

With regard to credit origination, Figure 17 illustrates that Asia dominated the voluntary OTC market once again, accounting for 45% of OTC transaction volume in 2008 (up from 39% in 2007). Leading the Asian pack were India and then China, which also sourced the majority of Asian VERs in 2007 and the majority of CERs since the launch of the CDM. Like last year, the U.S. supplied more volume (28%, up from 23% in 2007) than any single other country.

Figure 17: Transaction Volume by Project Location, OTC 2008[1]

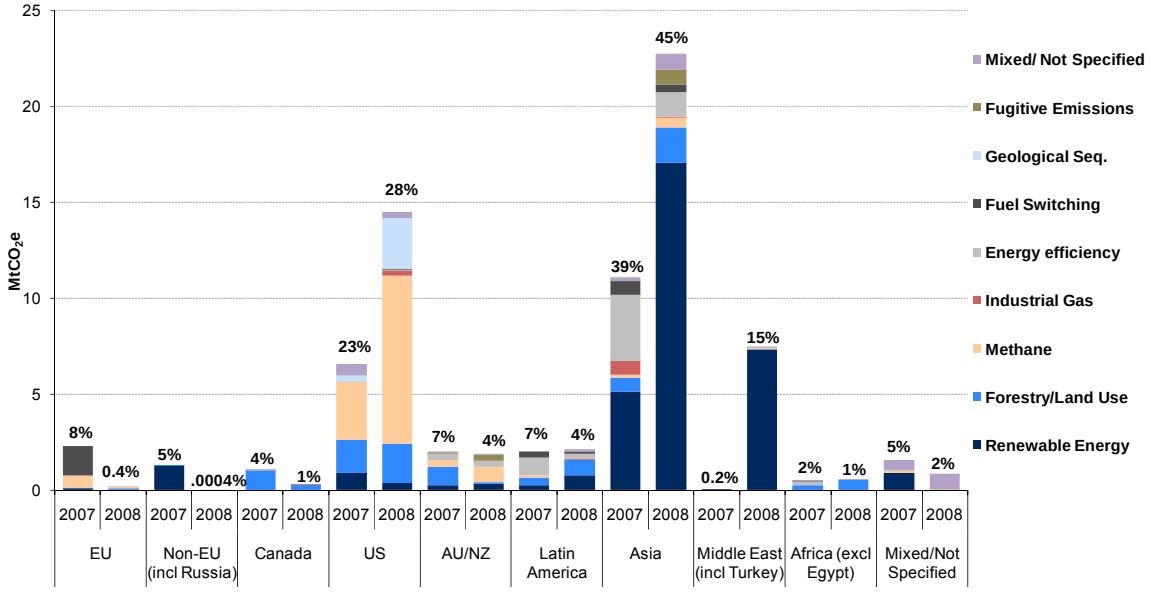


Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 335 observations

Figure 18 shows a combination of location, type, and growth for voluntary offset projects. As shown, 2008 saw tremendous growth in the importance of the Middle East as a major regional player in the voluntary markets. Two countries, Turkey and Egypt, which we have categorized as Middle East, supplied all of the transacted OTC volume in 2008, enabling the region to claim 15% of the OTC market volume (from 0.2% in 2007).

Both Latin America and Africa were the source of a roughly consistent number of credits from 2006 to 2008, but have lost market share steadily. Somewhat surprisingly, the EU and Eastern Europe nearly fell off the OTC origination map in 2008, dropping from 13% of the transacted VER market in 2007 to less than 1% in 2008. The drop-off in credits from the EU is due to double-counting concerns related to the Kyoto Protocol's accounting rules.

Figure 18: Transaction Volume by Project Location, OTC 2007 vs. 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 335 observations

6.2.1 Asia: Powering the VER Market

OTC transaction volume from Asian projects increased just over 100% between 2007 and 2008, from 11.1 to 22.7MtCO_2e. Like last year, Asia supplied more transacted VERs in 2008 (45%) than any other region, mimicking the region's origination prominence of the CDM market. This high market share is due to a large supply of credits resulting from pre-registration CDM projects and relative efficiency of transactions. Several suppliers also noted a buyer preference for Southeast Asia credits, which they referred to as "exotic credits."

Within Asia, we tracked transactions involving VERs from India, China, Malaysia, Cambodia, Indonesia, Thailand, and the Philippines (in order of greatest to least transaction volume). Of the 22.7MtCO_2e, 61% (13.9MtCO_2e) came from Indian projects, another 23% from China (5.2MtCO_2e), followed by Malaysia at 8% (1.8MtCO_2e).

By far, the most common Asian project types were renewable energy projects, specifically hydropower, which supplied more than three times its 2007 VER transaction

volume. In 2008, hydropower VERs represented 60% of transactions originating in Asia and 72% of those coming out of India and China. Renewable energy was also the dominant project type in Asia in 2007, but there were fewer credits coming from hydro, and the space was shared with energy efficiency projects.

The predominance of Asian hydropower is a direct consequence of the number of developing renewable energy projects in China and India. As a result, CDM project developers have turned increasingly to the voluntary market to sell their pre-CDM hydro VERs as they contend with CDM delays, and buyers are soaking them up. Industrial gas credits nearly disappeared as all relevant projects have been registered as CDM.

Forestry projects had a successful year in Asia, supplying 163% more transacted VERs in 2008 than in 2007, all of them from afforestation/reforestation conservation projects. Fugitive emissions also made their first appearance in the Asian voluntary market in 2008, courtesy of one large Indonesian natural gas flaring project.

6.2.2 North America: Priming the Pump

North America (which consists of the U.S. and Canada in our analysis, as Mexico was included in Latin America) supplied the second greatest share of OTC transaction volume, at 15.0MtCO_2e (29% of the OTC market). The United States supplied 96% of this volume. Across project types, the popularity of U.S. credits can be attributed to demands from pure voluntary and pre-compliance buyers. On the pure voluntary side, U.S. buyers seem to have a preference for credits “made in the USA”. For example, in 2008, several cities, such as San Francisco, announced plans to produce “locally grown” offset credits. Likewise, in 2008, Colorado launched the Colorado Carbon Fund as “a funding source for community-based clean energy and climate mitigation projects in Colorado.”[23]

Most investment, however, in the U.S. seems to be driven by expectations of federal regulation. Coming from the perspective of a U.S.-based broker, Lenny Hochschild describes 2008 as a year where “the focus went sharply from pure voluntary to almost pure pre-compliance.” While few suppliers described their buyers as purely pre-compliance (see Section 10), numerous suppliers and brokers cited compliance as a critical force behind investments, and to a lesser degree transactions, in the U.S. market.

In 2008, landfill gas methane projects sourced more VERs (7.5MtCO_2e, or 50% of the U.S. OTC market) than any other U.S. project type in 2008. In 2007, this position was assumed by livestock and illustrates the growing interest in landfill gas projects, which are considered to be good project-type picks for future U.S. compliance offsets.

Forestry projects remain a mainstay of the North American market, generating 11% (1.7MtCO_2e) of U.S.-sourced volume and 45% of Canadian-sourced volume (0.23MtCO_2e). The bulk of these forestry credits originated from afforestation/ reforestation-conservation and improved forest management projects, which also happen to be the only two types of forestry projects that generated CCX offsets in 2008.

The U.S. saw a sizeable increase in geologic sequestration volume and share of the OTC market. Geologic sequestration projects went from sourcing only 5% of the North

[23] Colorado Carbon Fund website. http://www.coloradocarbonfund.org/why.html.

American-based OTC transaction volume in 2007 to an impressive 18% of its volume in 2008–consistent with the four-fold increase in OTC market share that this project type enjoyed globally in 2008.

Overall, Canada experienced a 240%-contraction in voluntary transactions in 2008, from 1.7MtCO_2e in 2007 to 0.5MtCO_2e in 2008. This reduction in activity may be related to the many changes and the uncertain future that exists for the country's climate change strategy. Although the federal government issued the "Turning the Corner" plan in March 2008, its implementation of the proposed emissions reduction program has essentially stopped, and future developments largely hinge on decisions made in the U.S. Another factor that may have contributed to the reduction of voluntary projects is Alberta's energy intensity-based program. This mandatory program is currently up and running and is stimulating the purchase of offset credits as these are generally cheaper to obtain than paying into the compliance fund at CA$15/t$CO_2$e. This therefore leaves fewer projects for the voluntary market. As was the case in the U.S., most of Canada's transaction volume (51%) originated from landfill gas projects.

6.2.3 Middle East: Turkish Delight

The Middle East burst onto the voluntary market scene in 2008, driven mostly by renewable energy projects in Turkey (wind and hydro) and one project in Egypt. In 2008, the number of credits we were able to track from the Middle East rose from 0.5 to 7.5MtCO_2e (15% market share).

About 7.4MtCO_2e or over 99% of Middle Eastern credits originated in Turkey. Although it ratified the Kyoto Protocol, Turkey is ineligible to generate CDM or JI credits, and the voluntary market therefore remains its main niche until 2013, the end of the Kyoto Protocol. The majority of Turkish credits are from renewable energy projects (98%), which is not surprising, as the country is undergoing a transformation of its energy infrastructure via the Southeast Anatolian Project ("GAP") and is readying itself for CDM or JI project origination once it is eligible to generate CERs/ERUs after 2012. It is expected that Turkey will continue to be a significant source of VERs over the next several years as a recent report indicates that 64 voluntary projects are still under development.[24] It is, however, unclear how these credits will fit into a post-2012 regime.

6.2.4 Latin America & the Caribbean: Lack of Low Hanging Fruit?

The volume of credits produced in Latin America & the Caribbean remained steady over the past three years, while the regions' share of the OTC market has decreased from 19% (1.9MtCO_2e) of the market in 2006 to only 4% (2.1MtCO_2e) in 2008. Project developers cite the lack of government involvement, less efficient systems, and the exhaustion of "low-hanging fruit" as the primary hurdles to project development in this region.

We tracked voluntary projects from eleven Latin American and Caribbean countries: Brazil, Mexico, Nicaragua, Honduras, Ecuador, Chile, Peru, Panama, Bolivia, El Salvador, and Jamaica (in order from greatest to least transaction volume). More than three-quarters of the region's credits originated in Brazil (56%) and Mexico (21%).

[24] Pierre Guigon, Valentin Bellassen, and Phillippe Ambrosi. 'Voluntary Carbon Markets: What the Standards Say," April 2009. Available online at: http://www.aprec.net/documents/09-04_mc-wp09-4_voluntary_carbon_markets-what_the_standards_say.pdf .

Although we do not have country-specific information from last year, anecdotal evidence as well as both countries' dominance in the CDM market suggests that this is not very different from previous years.

Renewable energy and forestry comprised most of the region's transaction volume in 2008, notably different from the project mix in 2007, which was dominated by energy efficiency projects. The rise in forestry VER volumes can be attributed to several non-profit organizations developing credits from the region and working to build capacity. Biomass and hydro projects generated most of the volume within the renewable energy domain.

6.2.5 Australia and New Zealand: The Great Barren (VER) Reef?

New Zealand and Australia's volume and market share decreased from 7% (2MtCO_2e) in 2007 to 4% (1.6MtCO_2e) in 2008. Despite a 25% increase in the number of Aussie and Kiwi suppliers participating in this year's survey, the volume we collected from Australian and New Zealand projects decreased 20% from 2007, which is a direct result of impending Australia's upcoming Carbon Pollution Reduction Scheme (CPRS) and New Zealand's Emissions Trading Schemes (NZ ETS).

To make way for the launch of the CPRS, the Australian government's voluntary Greenhouse Friendly program is scheduled to cease accepting new offset providers in May 2009 and new carbon neutral product and service providers in July 2010. This has had the effect of slowing down Australian VER project development. Nevertheless, the CPRS's recent postponement to 2011 and future details on early-actor crediting may stimulate more Australian-sourced VER purchases in 2009.

Across the Tasman Sea, the ETS, passed by the New Zealand Parliament in September 2008, contained no early-actor crediting provision for voluntary offset purchases, which had the effect of weakening all New Zealand-oriented pre-compliant activity in the country in 2008. Following the November 2008 general elections, the ETS underwent a review and will likely be redesigned, although it is unlikely that the voluntary offset purchases will receive any early-actor credit in the resulting scheme, as one New Zealand carbon market expert noted. The current national government's general skepticism towards voluntary offsets has also had the effect of discouraging Kiwi firms from making "pure" offset buys. Coupled with the international preference for voluntary offsets from developing countries, as the "story behind an offset" counts in the voluntary markets, this skepticism has resulted in a contracted market for New Zealand-sourced offsets both domestically and abroad.

6.2.6 Africa: The VER Sustainable Development Disappointment?

Like Latin America, Africa's transaction volume has remained stagnant since 2006, while its relative share has decreased from 5.2% (0.5MtCO_2e) in 2006 to 1.2% (0.6MtCO_2e) of the market in 2008. Contrary to the hopes of many, that the voluntary carbon market would bring finance to African projects of high sustainable development potential, the reality is one of tiny volumes and limited capital to stimulate any economic development—sustainable or otherwise.

Survey respondents provided transaction information on projects from six African countries: Madagascar, Uganda, Mali, South Africa, Tanzania, and Eritrea (from greatest to least in terms of OTC transaction volume).

Project developers cite the lack of capacity, industrialization, and finance as the triumvirate of major hurdles to project development in Africa. Franz Rentel of the Climate Neutral Group has observed the abundance of "energy entrepreneurs" in Africa with innovative offset project ideas but "lacking the capacity to scale up their ideas into a fully commercial venture." Given Africa's relative lack of industrialization, he believes the continent's greatest potential for emissions reductions resides in the forestry and agricultural sectors, which possess high opportunity costs due to the competitive appeal of agriculture.

Moreover, because most developing countries' VER supply is generated from projects awaiting CDM registration, countries with low CDM participation are also less likely to generate offsets in the voluntary market. Holding fewer than 2% of registered CDM projects, this certainly holds true for Africa.

In addition to the link between low CDM project development and low VER generation, Bhavna Prasad of offset retailer The CarbonNeutral Company pointed out that African countries are held back in the voluntary markets because of the lack of government-led capacity-building efforts and the high investment risk assigned to African countries for numerous reasons. According to Prasad, the number of projects coming out of developing countries "has a lot to do with how proactive the governments are in promoting projects." By the same token, the strong engagement of the Chinese and Indian governments in CDM project development and approval explains why China and India have been the most common locations for CDM (and thus VER) projects.

At the same time, African projects generating credits only for voluntary buyers tend to be charismatic but very small, and thus have not impacted the continent's share of the voluntary market to any substantive degree. Lisa Ashford from project origination and consulting firm EcoSecurities commented, "We'd love to have more African VERs, but in general what we see are micro projects and limited reliable volumes."

6.2.7 EU and Eastern Europe: Double-Counting Downer

Voluntarily purchased credits from the EU and Eastern European countries experienced a major decline in 2008. The EU claimed 13% (2.3MtCO_2e) of the market in 2007, shrinking to less than 0.5% (0.2MtCO_2e) in 2008, while the share of Eastern European projects fell from 5% in 2007 to only a negligible amount in 2008. This precipitous decline is attributed to three factors: concern surrounding the possibility of double-counting a voluntary emissions reduction as a compliance reduction in a country's Kyoto inventory; the lower marginal cost of abatement in developing countries; and the appeal of developing-country VERs to voluntary buyers in Europe.

The double-counting issue is based around the concern that a VER generated and sold in a Kyoto committed country would reduce emissions thereby freeing up an Assigned Amount Unit (AAU). Concern over how to account for a voluntary emissions reduction achieved in a country with Kyoto (or other) compliance obligations has led several countries, including the Netherlands, to forbid domestic offset sales to foreign entities unless an AAU is also retired. This has had the effect of severely limiting voluntary project development in Europe and is likely having the same effect in New Zealand.

Moreover, in light of the absence of sustainable development motivations in Australia and Canada, project developers are more inclined to develop offset projects where the

marginal cost of abatement is less, such as in Asia, than in Europe. Furthermore, unlike regulated entities, who are primarily concerned with meeting their compliance obligations as cost-effectively as possible, European buyers seem to prefer offsets generated in developing countries rather than originating in their own region (unlike the U.S.).

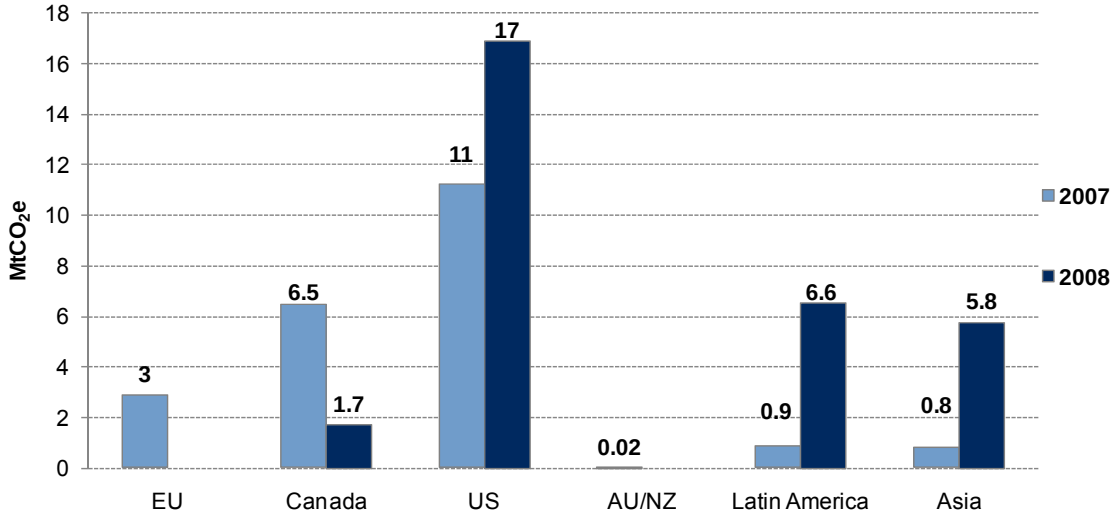
Survey respondents filled out transaction information on European projects from the following four countries: U.K., Germany, Netherlands, and Portugal. Because we asked for project information by region and not by country in last year's survey, we cannot directly compare European project locations of 2007 and 2008. European projects selling VERs in 2008 fell exclusively into two general project categories: A/R forestry and methane (agriculture and coal mine). This is not surprising as the EU ETS excludes offsets from forestry and methane projects.

6.2.8 Project Locations on the CCX: Across the Globe to the Windy City

The most significant trend with regard to the location of CCX projects was the move away from North America (Figure 19). While the United States continued to originate the majority of offset registered on CCX last year, a chunk of CCX offset growth came from overseas projects, specifically Latin America and Asia. Please note again that these relate to *registered* credits, not necessarily transacted.

Latin America experienced a six-fold increase for registered CCX offsets, from 0.9MtCO_2e in 2007 to 6.6MtCO_2e in 2008. Asia experienced an equally dramatic rise in offset registration, from 0.8MtCO_2e in 2007 to 5.8MtCO_2e in 2008. Although Asia has dominated the OTC market since 2007 in terms of project location, it had not made any significant presence in the CCX until 2008 due to outreach by the exchange. Interestingly, in 2008, Latin American offset projects supplied more than three times the registration volume to CCX (6.6MtCO_2e) than their transaction volume in the OTC market (2.1MtCO_2e). This seems to go against suppliers' impressions that the low OTC transaction volume for Latin America is mostly due to supply constraints rather than a lack of demand.

Figure 19: CCX-Registered Offsets by Project Location, 2007 vs. 2008



Source: Chicago Climate Exchange.

Consistent with the OTC market, Canada and Europe experienced sharp declines due to a CCX ruling prohibiting the registration of any credits from projects outside the U.S. unless they were located in a Kyoto non-Annex-1 country or from an activity not covered under the Kyoto Protocol. Canadian offsets decreased more than three times, from 6.5MtCO_2e in 2007 to only 1.7MtCO_2e in 2008, consistent with its reduced share in the OTC market (which fell from 1.7MtCO_2e in 2007 to only 0.5MtCO_2e in 2008).

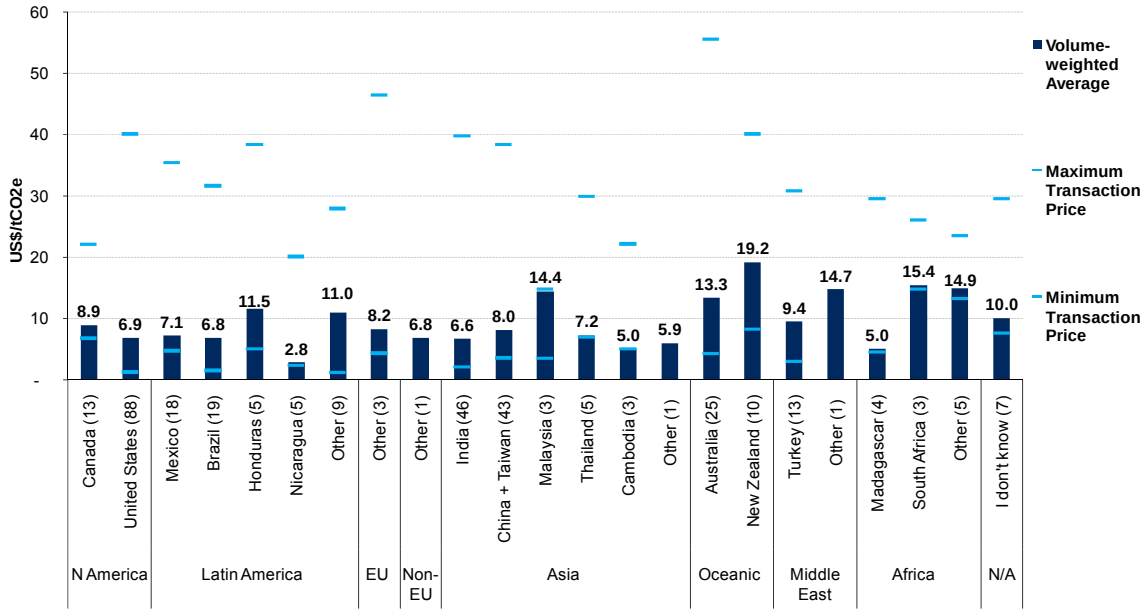
6.3 Price Trends by Project Location

Although a couple of countries (Canada, South Africa, and Thailand) sourced VERs into the OTC market at average prices consistently higher than the 2008 VER average (which was 7.34/tCO_2e), there does not appear to be a strong correlation between the project's host country and average VER price, see Figure 20.

New Zealand boasted the highest average credit price of \$19.2/tCO_2e, or approximately two and a half times the OTC VER average in 2008. In 2008, a staggering 83% of New Zealand-originated VERs were renewable energy credits verified to the Gold Standard. Average prices nearly doubled in Australia/New Zealand (from \$8.6/tCO_2e to \$15.4/tCO_2e) and Canada (from \$4.5/tCO_2e to \$8.9/tCO_2e), although these countries, interestingly, took smaller market shares in 2008 than they did in 2007. Other countries boasting high prices were South Africa (\$15.4/tCO_2e), Malaysia (\$14.4/tCO_2e), Australia (\$13.3/tCO_2e), and Honduras (\$11.5/tCO_2e).

The lowest average credit prices hail from Nicaragua at \$2.8/tCO_2e, although it is important to note that this value is heavily skewed toward the lower end of the country's price range because the lowest-priced credits were sold from one project that comprised 90% of Nicaragua's transaction volume.

Figure 20: Average Credit Price and Price Ranges by Project Location, OTC 2008[1]

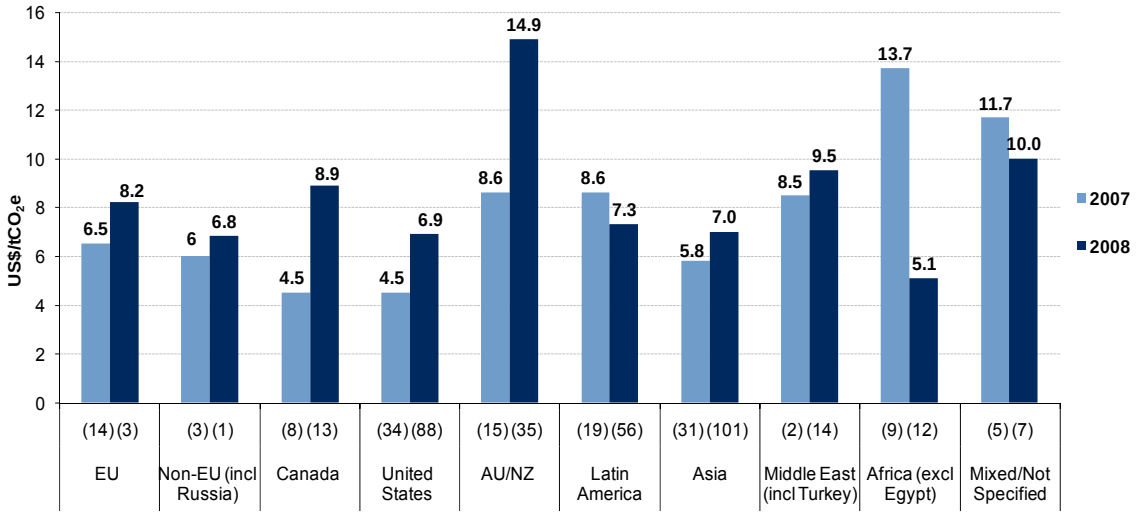


Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 330 observations

As we found last year with the $300/t$CO_2$e transaction, this year's highest credit price ($46.9/t$CO_2$e) was also claimed by an Australian renewable energy project. In 2008, two renewable energy projects, one solar and one wind, sold RECs as voluntary offsets. As Figure 21 shows, credit prices within regions and countries varied significantly between 2007 and 2008, implying that project location has a minimal impact on credit price relative to project type or verification standard.

Average credit prices increased in every region except in Latin America and Africa. The halving of average credit price in Africa is surprising giving the charismatic appeal of African offset projects due to their high development costs and potential to contribute heavily to sustainable development goals.

Figure 21: Average Credit Price by Project Location, OTC 2007 vs. 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance (1) Based on 330 observations

6.4 Stepping on the Scale: Project Size

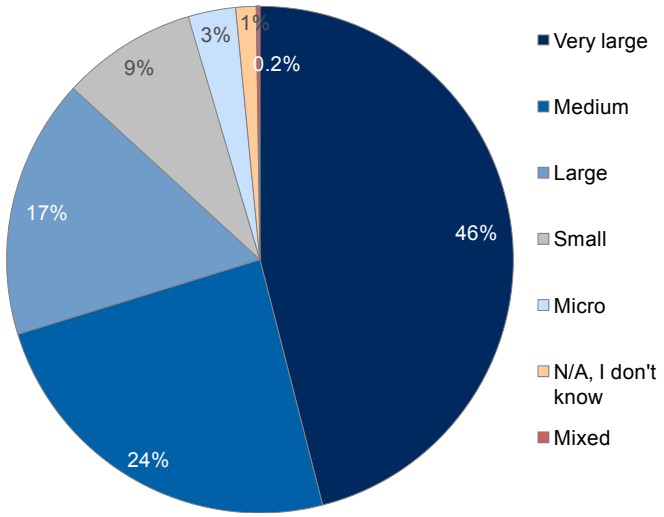
Projects in the carbon markets not only vary by type and location, but also by size. Hence, for the past three years, we have asked suppliers about the project size of credits sourced, defined as follows:

- Micro (less than 5,000tCO_2e/year)
- Small (5,000 to 19,999tCO_2e/year)
- Medium (20,000 to 99,999tCO_2e/year)
- Large (100,000 to 499,999tCO_2e/year)
- Very large (500,000tCO_2e/year or more)

Almost half (46%) of the OTC transaction volume in 2008 was generated by very large projects, 500,000 tCO_2e/year or above (Figure 22). Relative to last year, the share of "very large" projects increased by 14 percentage points at the expense of medium-sized projects, which lost an equivalent share. The share of VERs from large projects remained exactly the same (17%), whereas small and micro-sized projects remained within one percentage point of last year's share, at 9% and 3% in 2008 respectively.

In the past, we have used project size as a proxy for evaluating the voluntary market's ability to contribute to sustainable development at the community level as VER projects in Latin America and Africa often begin as micro, small, or medium-sized projects. The share of the OTC market occupied by micro and small projects is one way to measure the success of these projects.

Figure 22: Transaction Volume by Project Size, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 103 survey respondents

If we took away the largest single-project transaction made in the voluntary markets in 2008—a 9MtCO_2e transaction,(also the largest VER sale made in India's history and the largest transaction we have tracked to date)—the numbers would shift such that small and micro projects would have generated close to one-quarter of the OTC transaction volume in 2008. As it stands, however, projects of this size only generated around one-eighth of the market. This is less of an indication that the market is veering away from small-scale projects than it is a reflection of a few very large transactions made in 2008.

6.5 Demand for the Shiny and New: Project Vintage

6.5.1 OTC Vintages

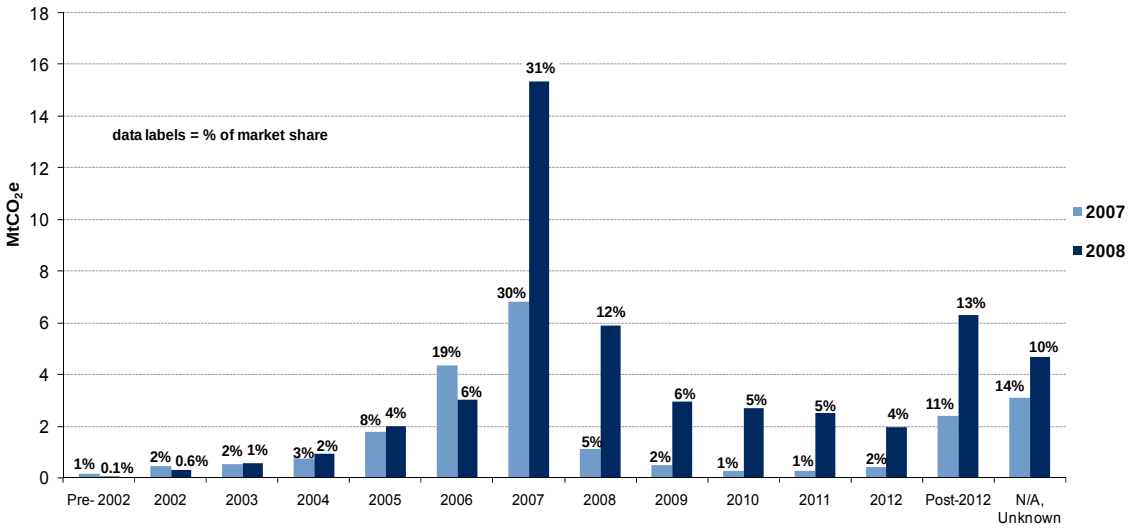
2008 was a new year for the OTC market, but similar to last year, the credits with a 2007 vintage were still the hottest commodity on the market. Like wine, a credit's vintage refers to the year in which the emissions reduction occurred.

Credits of 2007 vintage took the largest market share of any vintage in 2008 (31%). At one level this is not surprising, considering the time needed between issuance and a transaction. However, 2007 vintages were also the most popular credit type in 2007. Together, credits of vintage years 2007 and 2008 claimed nearly half of the 2008 OTC transaction volume.

Two trends are revealed by comparing 2007 and 2008 data, as illustrated in Figure 23. The first is that VER consumers seem to become more comfortable with future vintages, also known as "ex-ante" credits because the credits are sold before the emissions reduction is generated. In 2008, 33% of transaction volume originated from ex-ante credits—up from 22% in 2007. The second is that VER buyers continue to prefer recent ex-post credits to older ex-post credits, despite the reality that an older vintage does not necessarily represent any less of a reduction over "business-as-usual" than a more

recent or future vintage. Grattan MacGiffin of brokerage firm MF Global describes customers perceiving these vintages as “shiny and new”.

Figure 23: Transaction Volume by Credit Vintage, OTC 2007 vs. 2008[1]

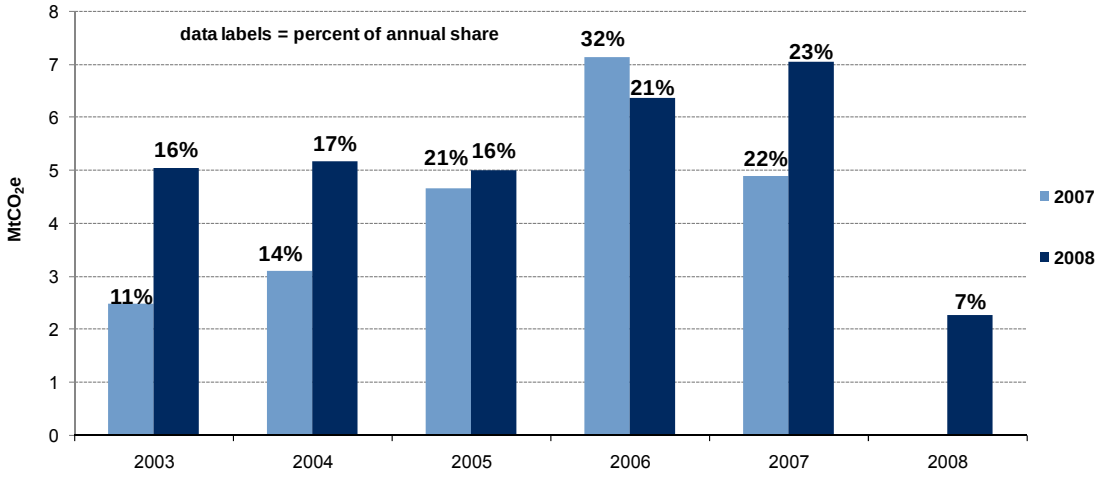


Source: Ecosystem Marketplace, New Carbon Finance. (1) 2008 figures based on 99 survey respondents

6.5.2 The Ex-Post Party: CCX Vintages

Similar to the OTC market, the most common vintage of credits newly registered on the CCX in 2008 was 2007. In terms of market share, however, credits from vintages 2003 through 2006 remained strong on the CCX. This is in sharp contrast to the OTC market, as shown in Figure 24, where pre-2007 vintages are much less in demand. Because volumes registered on the CCX have an ex-post requirement (i.e. the emissions reduction has already occurred) there are no vintages beyond 2008 available on the exchange.

Figure 24: CCX- Registered Volume by Vintage, 2007 and 2008



Source: Ecosystem Marketplace, New Carbon Finance.

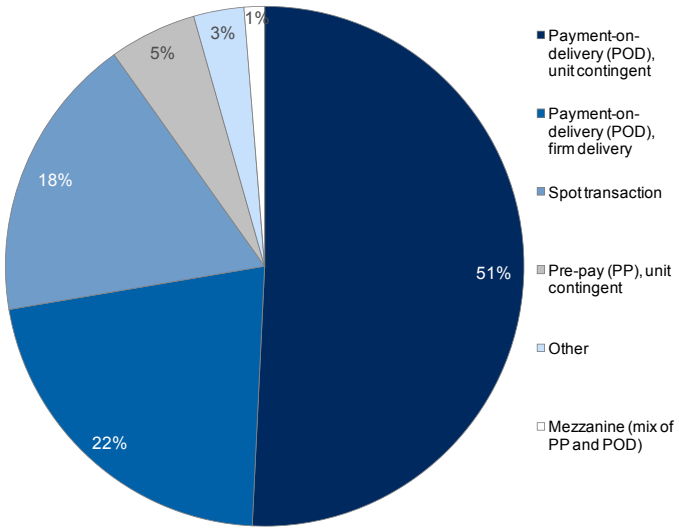
6.6 Getting the Goods: Contract Structures in the OTC Market

According to this year's survey, three main contract structures are representative for 91% of transactions in the voluntary OTC market: i) payment-on-delivery, unit-contingent; ii) payment-on-delivery, firm delivery; and iii) spot transactions. These terms are explained as follows: payment-on-delivery means that payment is made as the credits are verified and delivered; unit-contingent means that delivered credit volumes are not exactly specified in the contract, but dependent on how many are produced; firm delivery means that the volumes are exactly specified; and a spot transaction means that the credit has already been produced and the delivery and payment are made instantaneously. As this was a new question in our survey, we do not have any comparisons with previous years.

Contracts figuring payment-on-delivery (POD) and unit-contingent comprised the majority of the 2008 transaction volume (51%). Most of these transactions are probably associated with the 45% of transactions conducted as forward sales tracked in our current survey, i.e. vintages sold for 2008 and beyond.[25] Forward sales are often structured as POD unit-contingent contracts as many sellers cannot or will not take on full delivery risk, i.e. promise firm delivery. In addition, forward sales are frequently structured as a full off-take whereby the purchaser agrees to buy all offsets generated.

As a result of the delivery risk, the share of firm delivery contracts was only 22% of transaction volume. Project developers can only provide ballpark figures for the quantity of offsets that their project(s) will generate. As a result, some forward contracts entail partially specified quantities whereby counterparties agree to a minimum or maximum amount, but with options built into the contract to allow the purchaser or seller to trade above or below that quantity. Our figures exclude options for forward sales of post-2008 vintages, since options have not yet been exercised or foregone.

Figure 25: Transaction Volume by Contract Structure, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 102 survey respondents

Spot transactions comprised only 18% in 2008. These are exclusively associated with trades of issued VERs—of which we tracked 45% in 2008 (all vintages with 2007 and before). Buyers rarely enter pre-pay contracts (7%) or even a mix of pre-pay and POD—mezzanine contracts (1%). Uncertainty and asymmetric information typify the voluntary

[25] The figure of 45% assumes 2008 vintages were forward sales, as same year vintages are generally issued at the end of the year.

markets to the extent that counterparties rarely engage in contracts that entail payments upfront.

The rarest contract structure in the voluntary carbon space is indexed contracts whereby prices are indexed to a particular barometer. Indexed contracts for voluntary carbon are virtually non-existent (0.0005%) largely due to the lack of any form of a liquid indicator for voluntary carbon prices. The only exchange-traded product is currently the Climate Action Reserve Certified Reduction Ton (CRT) derivative contract on the Chicago Climate Futures Exchange (CCFE). However, due to patchy trading and very low liquidity it is unlikely that the CRT derivative can currently be utilized as a suitable price indicator.

7 The Flight to Quality: Verification and Standards

Summary Points:

- One of the clear trends of 2008 has been that almost all voluntary credits are now verified by an independent third-party organization: 96%, up from 87% in 2007.
- Last year saw further consolidation amongst the standards as well as increased collaboration between standards, exchanges, and registries to enhance trading and market transparency.
- Of the 17 identified standards available, the most utilized third-party standard by transaction volume was the Voluntary Carbon Standard (48%), followed by the Gold Standard (12%), the Climate Action Reserve (10%), and the American Carbon Registry standards (9%).
- Similar to project type, the verification standard utilized is a major determinant for transaction prices. Although volumes dropped significantly, prices for CDM/JI credit maintained their premium at average prices of \$21.30/tCO_2e. Above-average premiums (\$7.34/tCO_2e) were also paid for CarbonFix, GS, Green-e, GHG Friendly, CCB, the Reserve, ISO, Social Carbon, and even internally created standards.

Credits verified to the CCX and on the ACR were at the bottom of the price spectrum at average transaction prices of less than \$4/tCO_2e. This average discount is mostly related to the low carbon prices on the CCX itself and inexpensive reductions for geological sequestration, the most popular ACR project type in 2008.

The greatest challenge for the voluntary carbon market has, and continues to be, legitimatizing the effectiveness and legitimacy of the intangible carbon offset product. For example, in mid-2008, the U.S. Government Accountability Office released a report titled, "Carbon Offsets: The U.S. Voluntary Market Is Growing, but Quality Assurance Poses Challenges for Market Participants." In response to this type of concern, negative media attention and mixed sentiments from the environmental community, over the past several years voluntary carbon market stakeholders rapidly focused on creating defining processes, supportive infrastructure and, in some cases, increasing transparency in the marketplace.

Standards, verification, and registries have increasingly become the tools for assuring quality. However, it is important to note that 2008 saw a variety of initiatives designed to increase the legitimacy of offsetting. For example, last year the environmental organization Environmental Defense Fund re-launched Carbonoffsetlist.org, a list of projects reviewed and deemed as quality options by the NGO. It described the purpose of helping buyers find quality offsets. "We get a lot of questions from companies that want to buy carbon offsets, but do not know where to start or who to buy them from. This list is our answer. A set of high-quality projects that we have reviewed carefully and would turn to for our own offset needs."[26] Suppliers approached the issue of legitimacy from a variety of angles. One supplier, Terrapass, not only listed its full portfolio but also created a process to publicly vet projects before purchasing credits. Likewise, last year EcoSecurities released ProjectNet, which lists and provides details on the companies'

[26] : http://www.carbonoffsetlist.org

voluntary offset projects (as well as allowing for direct purchases). At the same time suppliers created coalitions, such as, the International Carbon Reduction and Offset Alliance and the Offset Quality Initiative, to guide self regulation.

In last year's report, we referred to 2007 as the "year of the standard". In response to the need for consistency and guidelines, and the general scepticism from which voluntary offsets suffered in the media, voluntary standards have become a fundamental tool for legitimizing voluntary offsets. In 2008, voluntary offset standards remained critical and continued to solidify as buildings blocks for a growing market.

With a proliferation of new standards in 2006 and 2007, many stakeholders voiced concern that navigating the array of options was yet another challenge in the market. In response, 2008 saw some consolidation of suppliers around specific standards and collaboration between different standard-setting organizations (as well as registries and exchanges).

As legislative developments toward regulated cap-and-trade markets have moved forward in states, provinces, and nations across North America and Australia, several voluntary standards began positioning themselves as pre-compliance standards. In addition to being seen as indicators of "quality assurance" regarding integrity, additionality, and other measures of an offset's quality, they have also begun to serve as markers—in a purely speculative sense—of offsets that could be awarded "early-actor credit" in future compliance markets in the U.S., Canada, Australia, and New Zealand.

For instance, given the importance placed on state-sanctioned offsets in recent U.S. cap-and-trade bills, the Climate Action Reserve (the Reserve or CAR) is seen as particularly attractive to U.S. pre-compliance buyers. The bill recently issued by U.S. Representatives Henry Waxman and Edward Markey indicated that only offsets purchased under a program established by "State or tribal law or regulation prior to 2009," verified to standards developed via "public consultation", and listed in a publicly available registry are eligible for inclusion in the "early offset supply" pool in a federal compliance market.[27] Based on the criteria set forth in this bill alone, the Reserve and RGGI credits would be considered good pre-compliance bets. The strict criteria laid out in the Waxman-Markey bill, however, are expected to be relaxed to include a broader array of offset standards in the voluntary market.

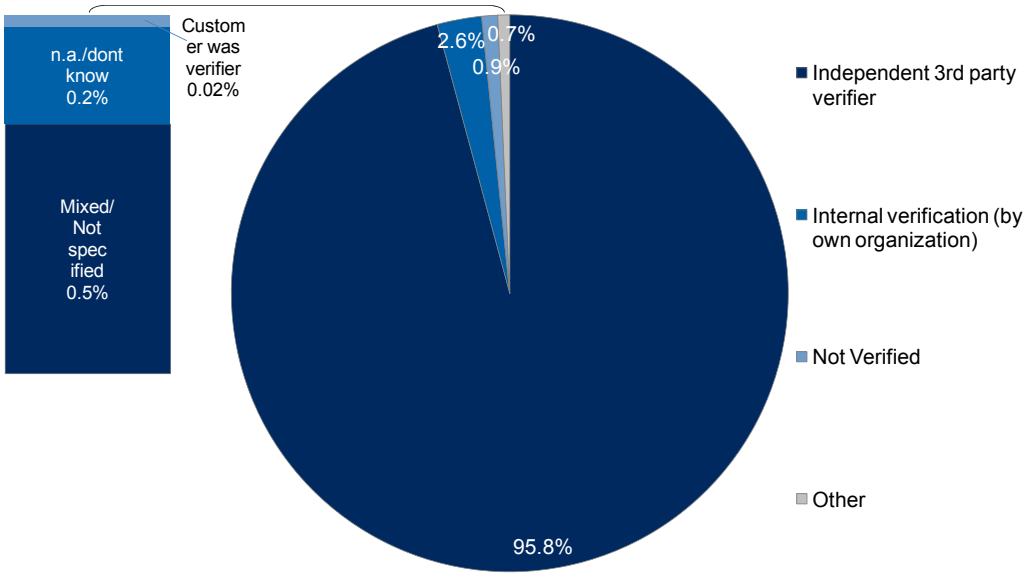
This section will delve into the consolidation and partnerships forged by standards in 2008, as well as an overview of the standards that exist today.

7.1 Third-Party is the Charm

While credits generated specifically for the voluntary carbon market are commonly referred to as Voluntary or Verified Emissions Reductions (VER), the term is a bit of a misnomer as third-party verification is not a requirement. In 2008, however, the vast majority of credits transacted *were* third-party verified, see Figure 26.

[27] Waxman-Markey Discussion Draft Bill, released 31 March 2009, Sec. 740, p. 420

Figure 26: Third-Party Credit Verification, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 106 survey respondents

According to suppliers, 96% of transacted VERs was verified by an independent, third-party, up 9 percentage points from 87% in 2007. This is yet another indication of the continued maturation of the OTC market, and we expect this trend to continue until this figure approaches 100%. Note that contracted forward sales generally stipulate future verification and are therefore counted as third-party verified in this report. Internal verification also increased to 2.6%, up from 0.04%, of transacted credits in 2008.

Less than 1% of transactions were not verified to any standard in 2008, which is a significant change from the 11% figure recorded in 2007. It is a clear reflection of the overall "flight to quality" in the OTC market, both on the supply and demand side.

7.2 Overview of Voluntary Market Standards and Certification Programs

As of the publication of this report, we identified 17 third-party voluntary offset standards and certification programs, two of which were launched in 2008. Generally, the standards are focused on carbon credit development, but 2 programs were created to certify suppliers themselves (the U.K. Quality Assurance Scheme for Carbon Offsetting and Green-e Climate). Some offset standards, such as the Climate Action Reserve and the Chicago Climate Exchange Offset Program (CCX) will only verify projects designed to meet their proprietary project methodologies. Others, such as the Voluntary Carbon Standard (VCS) and Gold Standard (GS), will accept projects verified to a select set of other standards' project methodologies, as well as those created specifically for their own standard.

The 2008 market saw a couple of entities adopt project design or verification methodologies for the first time, including EPA's Climate Leaders Offset Program. In addition, we saw two popular standards re-brand themselves with the U.S. pre-compliance market in mind. The California Climate Action Registry (CCAR) Protocols became the Climate Action Reserve (the Reserve), and The Environmental Resources

Trust (ERT) Registry became the American Carbon Registry (ACR). Additionally, a handful of standards has expanded the list of project types eligible for verification (VCS, CCX, and the Reserve), and several (such as Gold Standard, the Community, Climate & Biodiversity standards, and the Gold Standard) revised their verification processes.

Another trend in the OTC market that points to market maturation, is the linkage between standards, between registries, and between registries and exchanges. These efforts are being made in an attempt to streamline the buying process for consumers, as well as to increase transparency of the lifeline of VERs from origination to retirement.

For example, in May 2008, the Gold Standard launched a trading platform for Gold Standard-certified VERs in collaboration with Climex and the Gold-Standard registry administrator APX. The Voluntary Carbon Standard (VCS) made two unprecedented efforts to increase the transparency of VCS-certified credits and smooth the process of buying them (in addition to, undeniably, trying to increase its accessibility and attractiveness to buyers). First, it teamed up with three—not one—market infrastructure firms to run the VCS Registry System for VCUs. Second, it endorsed offset projects designed to another verification standard's (the Climate Action Reserve) methodologies as eligible for VCS accreditation. The launch of the VCS registry system, however, was delayed until early 2009.

In early 2009, two events marked the start of a new wave of standard-exchange partnerships. In January, the Gold Standard teamed up with World Green Exchange-provider World Energy to expand the list of arenas in which buyers could purchase Gold Standard credits. The following month, the Chicago Climate Exchange launched a program to trade Climate Action Reserve future credits (known as Climate Reserve Tons, or CRTs) to be transacted on its Chicago Climate Futures Exchange (CCFE).

7.2.1 Examples of Voluntary Carbon Offset Project Standards

American Carbon Registry Standard[28]

The American Carbon Registry is a non-profit enterprise of Winrock International and was founded in 1997 as the GHG Registry by the Environmental Defense Fund and Environmental Resources Trust (ERT). Before 2008, ERT served as an independent registry for the early voluntary carbon market. After becoming the American Carbon Registry, it now has its own set of standards while serving both as a voluntary emissions reporting registry and an offsets registry. It released its first voluntary project standard, a Forest Carbon Project Standard, in March 2009. The registry accepts offsets verified to American Carbon Registry standards as well as to select other standards' methodologies (CDM, VCS, and EPA Climate Leaders) as long as they comply with umbrella American Carbon Registry offset eligibility rules and additionality criteria. All listed credits have been third-party verified.

The Climate Action Reserve Protocols[29]

In 2008, the Climate Action Reserve (The Reserve or CAR) was established by (and is now the parent organization of) the California Climate Action Registry (CCAR); it was set up as a non-profit voluntary carbon offset registry and standards-setting body. Created by California statute in 2001, CCAR was initially a GHG emissions-tracking (as opposed to an offset-tracking) registry created to protect and promote early actions to reduce

[28] Available online at: http://www.americancarbonregistry.org
[29] Available online at: http://www.climateactionreserve.org

GHG emissions by organizations, but is referring clients to The Climate Registry for emissions reporting and maintaining its offset registry via the Reserve. After the California Air Resources Board (CARB) endorsed the Reserve Protocols in 2008, the standard jumped to prominence as a potential pre-compliance standard for several future regulatory carbon markets: the California market under AB 32, the Western Climate Initiative, and an impending U.S. carbon market. The Reserve has so far developed offset protocols for forestry, urban forestry, landfill, and livestock methane projects, and is developing many other protocols, including protocols for coal mine methane projects. The Reserve intends to expand its protocols internationally later this year, starting with North American Free Trade Agreement partners Mexico and Canada; and in April 2009, it launched an affiliated educational and networking institute called the Center for Climate Action.

The CarbonFix Standard[30]

The CarbonFix Standard (CFS) was launched in late 2007 and only pertains to afforestation, forest management, and agro-forestry projects with demonstrated commitment to socioeconomic responsibility. The CFS operates in a highly transparent manner, posting all current project documents online except for financial calculations and the prices of CO_2-certificates sold. CFS also provides customers with a way to purchase CFS-certified credits on its website directly from project developers. CarbonFix intends to partner with TZ1 to launch its standard-specific registry later this year.

Chicago Climate Exchange Offsets Program[31]

The Chicago Climate Exchange (CCX) has its own set of standardized rules for issuing credits for offset projects accepted into the voluntary cap-and-trade system. To screen applicants, the exchange has standardized rules for eight general types of projects and other project types may be approved on a case-by-case basis. Requirements for each project type are outlined on the CCX website. All projects must undergo verification by a third-party verifier, and verification reports are reviewed by the Financial Industry Regulatory Authority (FINRA) for completeness. Many offsets on the CCX are sold via aggregators.

The Chicago Climate Exchange maintains a registry for CCX offsets, which may be sold on the exchange by an Offset Provider or an Offset Aggregator. Offsets must be listed on the CCX registry before they may be sold on the Exchange.

Climate, Community, and Biodiversity Standards[32]

The Climate, Community, and Biodiversity Standards (CCB Standards) are a set of project-design criteria for evaluating land-based carbon mitigation projects and their community and biodiversity co-benefits. The Standards are managed by the Climate Community and Biodiversity Alliance (CCBA), an international partnership of businesses, research institutions, and non-governmental organizations. The CCB Standards do not generate tradable offset certificates and are frequently applied together with a carbon-accounting standard like the CDM or VCS. CCBA requires that projects be validated and then verified by approved independent third-party auditors to demonstrate that they produce not only emissions reduction credits, but also community and biodiversity benefits.

[30] Available online at: http://www.climateactionreserve.org
[31] Available online at: http://www.chicagoclimatex.com.
[32] Available online at: http://www.climate-standards.org

In late 2008, CCBA released a second edition of the standard. Key changes include modifications to the social and environmental benchmark criteria and a new Gold Level for projects that excel on biodiversity, community or adaptation criteria. The VCS-approved registries are able to include a tag for credits from CCB-certified projects in the serial number of listed offsets.

EPA Climate Leaders Offset Guidance[33]

The U.S. Environmental Protection Agency (EPA) Climate Leaders program is "an industry-government partnership that works with companies to develop comprehensive climate change strategies." In order to be considered a Climate Leader, companies must perform a company-wide GHG inventory, set performance goals, and annually report their progress to the EPA. In August of 2008, the program stepped into the carbon market arena by releasing "Offset Module Overview guidance", which takes a performance-based approach to carbon accounting and is viewed as a potential pre-compliance standard for future a U.S. regulatory market. The Climate Leaders program has approved offset methodologies for seven project types: afforestation/reforestation, captured methane end-use, landfill methane, livestock methane, commercial boiler, industrial boiler, and transit bus efficiency. Under development are methodologies for coal mine methane and forest management. The program is not currently linked with a specific registry, although companies who participate in the Climate Leaders program must agree to voluntarily report their emissions to EPA, and any offsets purchased are accounted for as an adjustment to that company's required annual emissions inventory.

Greenhouse Gas Services Standard[34]

Greenhouse Gas Services (GHGS) a joint venture of General Electric (GE) Energy Financial Services and the AES Corporation (AES) is focused on developing offset projects that will be eligible under future US Federal greenhouse gas regulations. Established in 2007, the GE AES Greenhouse Gas Services Standard was originally designed to build capacity in sectors where methodologies were not available. With the assistance of industry experts and guidance from governmental agencies, GHGS has developed and published four methodologies focused on methane destruction or capture: coal mine methane; wastewater treatment; landfill gas management; and agricultural waste management. Some of these methodologies were used in the formation of protocols for CAR and other high quality standards.

Each of the GHGS methodologies is based on the ISO 14064 Standard and the WRI/WBCSD guidelines for project accounting. Independent third party verification is a requirement of all project activities and all issued credits are serialized and accounted for on a registry. Going forward, GHGS will continue to build capacity and develop new methodologies under the GHGS Standard in emerging sectors.

The Gold Standard for VERs[35]

The Gold Standard is a non-profit foundation supported by 60 NGOs; it provides "best practice" methodologies for renewable energy and energy efficiency offset projects that contribute significantly to sustainable development. While the standard was originally created to supplement CDM and JI projects based on the belief that the CDM did not adequately screen projects for their contribution to sustainable development, it now also certifies offset projects generating VERs. The standard maintains a registry specifically

[33] Available online at: http://www.epa.gov/stateply/resources/optional-module.html
[34] Available online at: http://www.ghgs.com/ghgs/index?page=home&view=GHGS_VIEW
[35] Available online at: http://www.cdmgoldstandard.org

for Gold Standard VERs (managed by the private firm APX) as well as a project database for projects selling Gold Standard-verified CDM and JI credits as well as VERs.

The foundation released Gold Standard Version 2 in July 2008 to present the rules more clearly to potential accreditation seekers and also released a "toolkit" that describes the Gold Standard project cycle and case studies. In 2008, the company also teamed up with an insurance provider, in this case CarbonRe, to offer reduced insurance rates to project developers seeking Gold Standard certification.

Greenhouse Friendly[36]

Greenhouse Friendly (GF) is the Australian government's voluntary carbon offset program for encouraging GHG emissions reductions by, among other things, "providing businesses and consumers with the opportunity to sell and purchase greenhouse-neutral products and services." The initiative provides two different services: Greenhouse Friendly Abatement Provider (offset project) certification and certification of "carbon neutral" products and services. GF's "carbon-neutral" accreditation requires the preparation of an independently verified life cycle assessment, an emissions-monitoring plan, annual reports, and the use of GF-approved carbon offsets. Offset projects must be Australia-based. GF-certified offsets may be purchased on the OTC market or on the Australian Climate Exchange.

At the end of 2008, the Department of Climate Change had ceased accepting new projects under the Greenhouse Friendly program in preparation for the anticipated start of Australia's National Carbon Pollution Reduction scheme on July 1, 2010. Offset projects generating emissions reductions after this date will not be eligible to be sold with the GF certification; however, emissions reductions that occurred before this date will still be able to be sold after the start of the Reduction scheme. The Australian government is making arrangements to transition from Greenhouse Friendly to a National Carbon Offset Standard. A draft National Offset Standard was released in December 2008.

ISO 14064 Standards[37]

The ISO 14064/14065 Standards are part of the International Organization for Standardization (ISO) family of standards. Released in 2006 and 2007, they govern the quantification, reporting, and verification of GHG emissions. The ISO 14064/65 Standards were created to be "regime neutral", so that they could be used as the basis for any program, but they are increasingly treated as their own third-party standard. Certain voluntary offset schemes, such as the Canadian GHG CleanProjects Registry, will only accept credits from projects verified to the ISO 14064/14065 Standards.

Plan Vivo[38]

Plan Vivo is a program designed for community-based agro-forestry projects. The system was created eight 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 voluntary agro-forestry carbon offset projects in Mexico, Uganda, and Mozambique. The Plan Vivo system aims to ensure that its projects deliver the following benefits: social benefits,

[36] Available online at: http://www.greenhouse.gov.au/greenhousefriendly.
[37] Available online at: http://www.iso.org/iso/catalogue_detail?csnumber=38381.
[38] Available online at: http://www.planvivo.org.

biodiversity benefits, transparency, additionality, foundations for permanence, an ethical option, and scientific and technical partnerships. The organization anticipates verifying REDD (Reducing Emissions from Degradation and Deforestation)-projects combined with other forestry activities in the near future. Plan Vivo maintains a Buyer Register on its website and has partnered with TZ1 to register its credits.

Social Carbon Standard[39]
The Social Carbon Standard is a methodology and certification program created and owned by the Brazilian NGO Ecológica. 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 of existing power relations and political context." The methodology was first created to ensure "higher-quality Kyoto Protocol carbon projects" but is now also used for voluntary market projects. In 2008, the standard appointed TZ1 to manage its registry.

Thus far, the Social Carbon Company has only verified projects in Brazil but has plans to expand globally. Separate from, but related to, the Social Carbon Standard is the Social Carbon Company, which helps fund the Standard and exclusively sells credits verified to the Social Carbon methodology, although Social Carbon credits may also be sold by other third-party suppliers. The Company is a partnership between the Ecológica Institute and CantorCo_2e, an energy and environmental commodity brokerage firm.

TUV NORD Climate Change Standard
The TUV Nord Climate Change Standard was developed by verification firm TUV NORD. However, publically available information on the standard is scarce, and thus the standard has been left out of Table 4.

VER+ Standard[40]
VER+ is a voluntary offset standard launched by project verifier TÜV SÜD for projects that are not eligible for CDM or JI accreditation but follow the CDM and JI project design methodologies, such as projects from countries that have not ratified the Kyoto Protocol or are awaiting CDM certification. Launched in 2007, it focuses purely on voluntary offset projects. The standard notably excludes credits from nuclear energy and large hydroelectricity projects, and the standard can be validated and verified only by accredited DOE / AIE organizations for corresponding protocols under UNFCCC. In tandem with VER+, TÜV SÜD created the BlueRegistry in July of 2007 to serve as a database of certified VERs and Renewable Energy Certificates (RECs).

The Voluntary Carbon Standard[41]
The Voluntary Carbon Standard (VCS) was launched in November 2007 by the Climate Group, the International Emissions Trading Association, and the World Economic Forum to standardize the voluntary offset market. Credits certified via the VCS are called Voluntary Carbon Units (VCUs). "Version 1" of the VCS was released in March 2006 as both a consultation document and a pilot standard for use in the market. Version 2 of the standard was launched in the fall of 2007. The VCS accepts project methodologies approved by the CDM and the Climate Action Registry. It also plans to approve other methodologies.

[39] Available online at: http://www.socialcarbon.com/en
[40] Available online at: https://www.netinform.de/KE/Beratung/Service_Ver.aspx
[41] Available online at: http://www.v-c-s.org

In 2008, VCS teamed up with three registry providers (APX, Caisse des Depots, and TZ1) to provide the infrastructure for the VCS Registry System, which finally made registered VCUs eligible for purchase in March 2009. The VCS multiple-registry system will permit inter-registry transfers in the near future.

Supplier-Specific Standards
Within the OTC market, many suppliers utilize their own set of screens or standards for both developing offset projects and deciding which offsets are viable purchases. For example, retailers such as The Climate Trust and Native Energy have developed independent standards.

7.2.2 Offset Provider Certification Programs

Green-e Climate[42]
Green-e Climate was launched in early 2008 as a sister program of Green-e Energy, which has been certifying renewable energy for over a decade. Green-e Climate was developed to provide certification services to retail providers retiring carbon credits to sell as carbon offsets to customers. This program requires that suppliers sell credits certificated by one of four voluntary standards (including CDM, Gold Standard, VCS, and the Green-e Climate Protocol for Renewable Energy). Additionally, retail offset providers must undergo an annual independent audit of their supply and sales to safeguard against the double-selling of offsets, and a twice annual marketing compliance review to guarantee accurate disclosures are made to customers. Green-e Climate certification for carbon offset products aims to ensure that carbon credits are additional as well as independently certified and verified, that project developers and sellers follow accurate accounting practices, and that sellers disclose relevant information about offset sources.

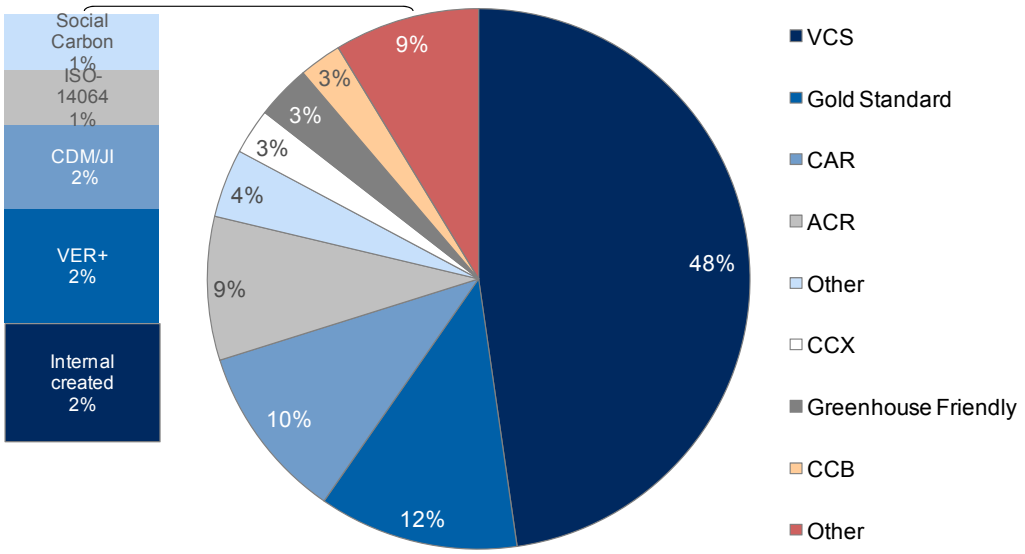
Quality Assurance Scheme for Carbon Offsetting[43]
The Quality Assurance Scheme for Carbon Offsetting is a U.K.-government standard for offset retailers. The program was launched in March 2009 and is being run by AEA Technology, an independent company appointed by the U.K. Department of Energy and Climate Change. Retailers approved by the Quality Assurance Scheme are awarded a "Quality Mark" for their products (as opposed to the retailer itself). The aims of the scheme are to direct consumers to high-quality offsets and to educate consumers about the role offsets can play in tackling climate change. The scheme lists offset suppliers whose offsets have been approved on its website.

7.3 The Standards Popularity Contest: Leaders Solidify

New arrivals to the voluntary markets and veterans alike have bemoaned the large number of voluntary offset project standards, which currently totals 17. To some degree, consolidation seems to be occurring around a few standards, although EPA Climate Leaders and TUV Nord released new standards in 2008 and differentiation in the standards' missions suggests that the voluntary market will be characterized by more than a handful of standards for some years to come.

[42] Available online at: http://www.green-e.org
[43] Available online at: http://offsetting.defra.gov.uk

Figure 27: Third-Party Standard Utilization, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 335 observations

Figure 27 shows that the most preferred third-party standard in 2008 was the Voluntary Carbon Standard, which certified nearly half (48%) of VERs transacted in the OTC market. In a distant second, third and fourth place were the Gold Standard (12%), CAR (10%), and ACR (9%) standards. Standards that were found least popular in last year's report remained that way in 2008. The exception was CAR, which ended up with 10% of the OTC market in 2008 despite the fact that suppliers reported it as being one of the least successful standards in 2007.

This dramatic shift in the perception of CAR can largely be attributed to those protocols perceived to be the "best bets" for eligibility in future regulatory cap-and-trade schemes. This trend has led such standards to be deemed "pre-compliance" standards. For example, it became clear in mid-2008 that CAR had a good likelihood for pre-compliance under not one but three future compliance cap-and-trade regimes—California, the Western Climate Initiative, and a U.S. federal program—as the California Air Resources Board endorsed a number of CAR-verified offset protocols as eligible in its cap-and-trade scheme scheduled to take effect in 2012 (commonly referred to as "AB 32" for the California Assembly bill in which the scheme was proposed).

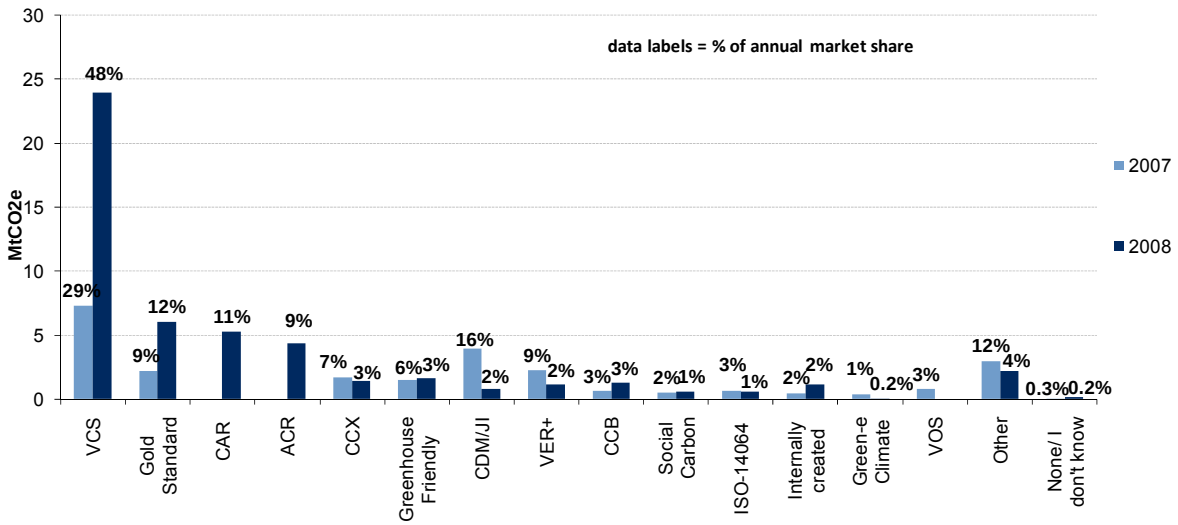
CCX (3%) and Social Carbon (1%) each took minor shares of the OTC transaction volume in 2008. CCB, VER+, ISO 14064, represented only 3%, 1%, and 1% of the OTC market respectively.

Figure 28 portrays the changes in market share of most standards between 2007 and 2008. VCS was the clear winner in 2008, with an increase in its marketshare by 16 percentage points between 2007 and 2008. Gold Standard maintained relative popularity, claiming a slightly larger percentage of the market in 2008 (12% vs. 9%). While in 2007, CAR and ACR were not major players as third-party standards, they claimed sizeable shares of the 2008 market on the back of pre-compliance activity. CAR's increase was mostly due to landfill gas credits, whereas ACR was most popular with both landfill gas and geological sequestration. Similar to last year, 2% of

transactions were comprised of credits verified to a retailer's or buyer's internal standard. Despite higher 2008 volumes, the Australian Greenhouse Friendly standard actually lost market share in 2008 by 3 percentage points (from 6% in 2007 to 3% in 2008).

Notable declines in actual transaction volume between 2007 and 2008 were CDM/JI, VER+, and the Voluntary Offset Standard (VOS), which is now inactive. CDM/JI credits were the second most popular credit type in 2007 (16%) on the OTC voluntary markets, but they dropped to only 2% of the market in 2008. Voluntary transaction of CDM/JI credits decreased because of their high price (they claimed the highest average price of any standard last year), strong demand from compliance entities, and increasing concerns about their quality. VER+ was another popular standard in 2007 which lost substantial market share in 2008 (from 9% to 2%) and the VOS appears to have fallen off the market stage entirely as we did not track any VOS credits in 2008.

Figure 28: Third-Party Standard Utilization, 2007 vs. 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1) 2008 figures based on 335 observations

In last year's survey, we also asked participants to estimate which standards they would most likely use in 2008. They had the option of checking multiple standards and we did not the weigh the results by volume. Hence, we cannot directly compare the values shown above with the expectations in last year's report. However, if we remove the volume weighting the differences are as follows.

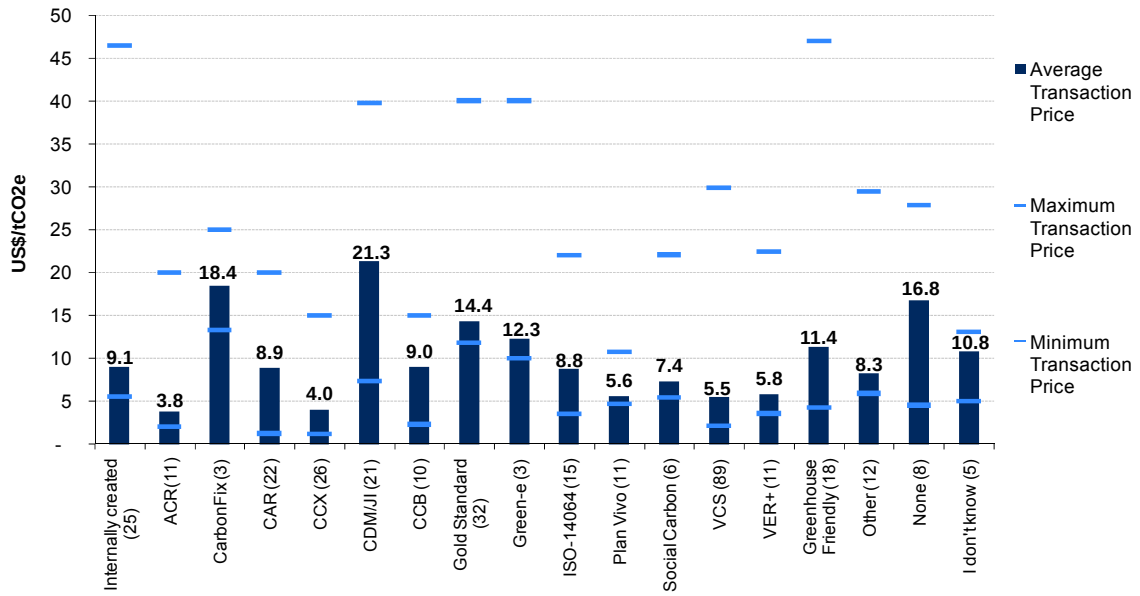
About 23% of last year's survey respondents planned to use the VCS in 2008, followed by the Gold Standard (18%), the CCB Standard (10%), and VER+ (10%). This compares to actual usage in 2008 of 29%, 11%, 6% and 13%. Hence, the VCS and CCB have actually been used by fewer participants than expected whereas the opposite holds for the GS and VER+. The VER+ still declined in market share though, as the average transaction size was relatively small.

On the other end of the preference spectrum, suppliers last year reported CAR (then known as CCAR) as the standard from which they would least likely seek verification (1%), followed by CCX (2%) and VOS, Social Carbon, and retailer-specific standards (each at 3%). In 2008 this was 8% for CAR and 12% for CCX, much higher than expected, and 2% for Social Carbon, slightly lower than expected.

7.4 Prices According to Standard Utilized

As already shown in our previous reports, standards are an important determinant for transaction prices with average prices ranging from $3.80/t$CO_2$e for the ACR to $21.30/t$CO_2$e for CDM/JI credits. However, every standard fetched a wide range of prices (see Figure 29), and credit prices varied roughly as much by project type as they did by standard (see also Figure 20).

Figure 29: Credit Prices and Price Ranges by Standard, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 330 observations. Note: Numbers within parentheses indicate number of data points.

CDM/JI offsets sold to voluntary buyers claimed the highest prices at $21.30/t$CO_2$e—approximately 2.3 times the average value they fetched in 2007 and 190% higher than the value of the market-wide average OTC credit price in 2008. The reason behind the large premium is that these credits are regulated by the UNFCCC and are consequently considered to be of high quality. In addition, prices for CDM/JI credits on the regulated exchanges such as the European Climate Exchange reached $15-30/t$CO_2$e, which also supported prices on the voluntary OTC market.

CarbonFix, Gold Standard, and Green-e garnered the second-highest average prices at $18.40/t$CO_2$e, $14.40/t$CO_2$e, and $12.30/t$CO_2$e, respectively. As Figure 29 indicates, some unverified credits are still earning a premium on the market (as they did last year), although these contracts tend to be direct agreements between a buyer and a project developer to source credits of already-known high quality. The highest priced credits, which sold for almost $47/t$CO_2$e, were RECs sold as offsets generated by renewable energy in Australia. Less expensive, but still obtaining decent prices around the $7-9/t$CO_2$e range are standards such as CAR, CCB, ISO, and Social Carbon.

On the lower end of the spectrum, ACR and CCX claimed the lowest-average OTC prices, at $3.80/t$CO_2$e and $4.00/t$CO_2$e, respectively. The reason behind the low price for ACR credits is mostly linked to the most prevalent project type transacted: inexpensive credits created through geological sequestration. CCX credits consistently

trade at a discount to the average price given the market's concerns about additionality and integrity, and the fact that on the exchange CFIs trade at only $1-2/t$CO_2$e.

It is important to remember that while credits verified to a third-party standard tend to sell for a premium on the voluntary market, they are also costlier to produce. Validation, verification, and credit issuance can range from several thousand to hundreds of thousands of dollars depending on the standard used and the size of the project.

Table 4: Offset Standards in the Voluntary Carbon Markets, 2009

Standard	Description	Env. & Social Co-Benefits Req'd?	Registry	Geographic Scope	Project Start Date Limits	Fees (US$ unless otherwise specified)[1]	Total Projects/VERs Verified [2]
American Carbon Registry Standard	Certification program for emissions reporting, offsets, and a registry	No	Registry incorporated	Focused on N.A.	On or after 1 January 2002 (forestry projects may start earlier)	Membership: $1,000 (initial),$500 (annual); Eligibility screening: $1,000 (1st project), $500 (annual)	26.7Mt$C0_2$e ERTs issued
CarbonFix	Certification program for forestry offset projects	Yes	Registry incorporated; TZ1 registry soon	International	After 11 December 1997	Validation: €1,500; Sales fee: €0.50/t	0.21Mt$C0_2$e (2008 only)
Chicago Climate Exchange Offset Program	Internal system for CCX-verified offset projects & CCX carbon credits	No	Registry incorporated with trading platform	International	Varies by project type (ex-post credits only)	None (only verification fees charged by project verifier)	53.1Mt$C0_2$e
Climate Action Reserve	Certification program for offsets and a registry	No	Registry incorporated	U.S. currently; Mexico and Canada soon	After 1 January 2001 (new project protocols excepted)	Project fee: $500; Annual fee: $500	6 projects / 0.6Mt$C0_2$e
Climate, Community & Biodiversity Standard	Validation program for offset projects	Yes	Projects on website; TZ1 registry	International	None	None (only validation fees charged by auditor)	8 projects
EPA Climate Leaders Offset Guidance	Guidance for companies on voluntary offset use	No	No	Global	After 20 February 2002 (some exceptions)	Unknown	None
GE/AES Greenhouse Gas Standard	Certification program for offsets and project developer	No	Yes	U.S.	After 1 January 2000	None (only validation fees charged by auditor)	0.2Mt$C0_2$e
Gold Standard	Certification for offset project & carbon credits	Yes	Yes	International	2004	Pre-feasibility assessment: $0.01-$0.10/ t (expected); Micro-scale project validation fee: $5,000; Micro-scale project verification: $2,500 (annual)	313 projects
Green-e Climate	Certification program for offset retailers	No	Registry incorporated	Aimed at N.A.; International possibilities	Variable	Annual fee: $6,000; Size-based volumetric fee: $0-$30,000	10 projects

Greenhouse Friendly	Certification program for offset sellers & carbon neutral products	No	Australian Climate Exchange Registry	Australia	After 18 June 2001	None	Unknown
ISO 14064	Certification program emissions reporting, offset projects, and carbon credits	No	No	International	Methodology released in 2006	Purchase of methodology document: $88	Unknown
Plan Vivo	Guidelines for forestry and agro-forestry offset projects	Yes	No	International	Ex-ante crediting only	PIN evaluation: $1,000; Validation: $10,400 (est.)	3 projects / 0.18MtC02e (2008 only)
Quality Assurance Scheme for Carbon Offsetting	U.K.-government certification program for offset retailers	No	Not Applicable	International	During or after March 2009	Initial offset approval: £750-10,000 (company revenue-dependent); Approved offset renewal; £750-4,444; Methodology review: £1,000	5 retailers certified
Social Carbon Standard	Validation program for offset projects	Yes	TZ1 registry soon	South America & Portugal	None	None (only verification fees charged by project verifier)	0.43 $MtC0_2e$
VER+	Certification program for offset projects and carbon neutral products	No	TÜV SÜD BlueRegistry	International	On or after 1 January 2005	Issuance (initial listing) of VER+ credits is free of charge; Registration opening fee: €550; Annual fee: €400 per account; €0.03/t transfer. Some exceptions to this structure.	24 projects / 2.6$MtC0_2e$
Voluntary Carbon Standard	Certification for offset project & carbon credits	No	Project Database; Registry provided by TZ1, APX, and Caisse des Depots	International	On or after 1 January 2000	Issuance: €0.04/$tC0_2e$	3.6 $MtC0_2e$

Source: Ecosystem Marketplace, New Carbon Finance. Note: Data in table is accurate as of April 2009.

[1] *Fee information availability varies among standards; only what was publically available is presented in this table. The fees presented above are standard-imparted and do not include fees charged by the project auditor.*

[2] *Total refers to the entire volume of VERs verified during the existence of the standard, as of April 2009, except where otherwise noted.*

8 Increasing Infrastructure: Registries and Exchanges

Summary Points:

- There are 18 third-party registries that currently exist or are under development.
- In 2008, only 29% (or 15.2MtCO_2e) of VERs sold in the OTC market were tracked in third-party registries, a small decrease from the 31% of VERs tracked in registries in 2007.
- Other important registries in 2008 were the American Carbon Registry (21%), suppliers' own internal registries (13%), the Climate Action Reserve (11%), the NSW GGAS (9%) and the BlueRegistry (9%). The popularity of suppliers' internal registries can be linked to the unavailability of a VCS registry and the dominance of the ACR is most likely caused by some reporting bias. Given the prominence of their standards, it is expected that CAR and the GS would be at a similar utilization level.
- With respect to our 2007 results, most of the registry usage follows the market's standard trends. One can therefore see CAR and ACR increasing, whereas CCX, CDM/JI and the BlueRegistry (VER+) decrease in popularity—in line with their respective standards.

8.1 Registries: Tracking the Trades

Over the past two years, the use of registries that track ownership and issue carbon credits has become increasingly common. In 2008, at least 29% of voluntary transactions were tracked in some third-party registry compared to 31% in 2007. However, this year survey responses also reflect a greater understanding of the role of registries in the markets as registries have marketed themselves and linked with standards. Helen Robinson, CEO TZ1 Registry described the uptake of registries "The market has now evolved from being a bi-lateral paper-based transaction of untraceable 'luxury' goods. Buyers are coming to realize that managing your emissions makes good business sense, increasing demand for offsets approved under quality standards and moving the market to its next phase of growth: a more commodity-like marketplace."

This relatively limited market share of registry-tracked credits highlights the time it has taken for most standards to develop registries and to encourage their uptake by the market. The most important factor was the continuous delay of the VCS registry system which had the consequence that credits from the standard responsible for almost half of 2008 transactions had no place where they could be registered and tracked. At the same time, standards that did have registries in place such as CDM/JI and CCX saw their market share decline.

The formation of alliances between standards and registries was a major trend in 2008. The Voluntary Carbon Standard partnered with three separate registry providers–APX, TZ1 and Caisse des Depots to provide the back-end infrastructure for its Voluntary Carbon Standard (VCS) Registry System. In 2008 and early 2009, registry operator and independent-registry host TZ1 announced it would serve Social Carbon, the American Carbon Registry, Carbon Fix, and World Energy's World Green Exchange. Likewise, the infrastructure provider APX teamed up with the Gold Standard, the Climate Action Reserve.

8.2 Keeping Tabs on Emissions vs. Sales

The term GHG "registry" covers a broad array of systems. In the context of the voluntary carbon markets, existing GHG-accounting registries can generally be divided into two different categories: *emissions-tracking registries* and *credit-accounting registries*.

- ***Emissions-tracking registries*** track organizations' GHG emissions and reductions but do not issue serialized carbon credits. These registries help entities establish baselines, account for emission reductions, and are a critical tool for regulated or voluntary cap-and-trade systems. Emission-tracking registries include: the Canadian GHG Challenge Registry, the Canadian Clean Start and CleanProjects Registries, the Carbon Disclosure Project, the American Carbon Registry, and the Climate Registry. A few of these emissions-tracking registries also have systems for registering actual carbon credit transactions.
- ***Credit-accounting registries*** are designed specifically to issue and track carbon credit transactions. Accounting registries track only verified emissions reductions or allowances after they have become carbon credits, often utilize serial numbers as an accounting tool, and generally incorporate screening requirements such as third-party verification to a specific offset standard. They typically do not track company emissions or reductions disclosures.

Voluntary third-party registries may be *independent*, meaning that they accept credits from a variety of standards, or are *standard- or exchange-specific*, meaning they are built specifically to serve a particular standard or exchange. In a few cases, independent registry companies also serve as infrastructure providers for standard or exchange-specific registries, while others serve as infrastructure providers without hosting independent registries of their own. As of mid-2009, we have identified 18 existing or soon-to-be-launched credit-accounting registries that can be categorized as independent, standard-specific, or exchange-specific, and 3 infrastructure providers that do not also serve as independent registries themselves. For a quick list, see Table 5.

Table 5: Carbon-Accounting Registries Serving the Voluntary Carbon Markets

Independent	Standard-Specific	Exchange-Specific	Infrastructure Providers
▪ The Registry Company (Regi) ▪ TZ1 ▪ GHG CleanProjects Registry ▪ Traceable VER Registry	▪ American Carbon Registry ▪ Bank of New York Mellon's Global Registry and Custody Service ▪ BlueRegistry ▪ Gold Standard Registry for VERs ▪ VCS Registry System ▪ Climate Action Reserve ▪ Social Carbon Registry ▪ Greenhouse Friendly Abatement Register. ▪ Plan Vivo Registry ▪ CCB Standards Registry	▪ Chicago Climate Exchange (CCX) Offset Registry ▪ Asia Carbon Registry ▪ Triodos Climate Clearing House Registry ▪ Australian Climate Exchange Registry	▪ TZ1 ▪ APX ▪ Caisse des Depots

Source: Ecosystem Marketplace, New Carbon Finance

The registries are compared in more detail in Table 6 and Table 7.

As illustrated above, third-party credit-accounting registries span across a variety of roles. By nature, they are constructed to provide processes for registering, issuing, transferring, and/or retiring credits, but how they perform these processes depends on each registry's affiliations with standards or personal rules. Within the arena of independent registries and registry infrastructure providers, key differences include:

- *Market Position*: Role as an independent registry and/or infrastructure provider for standards' registries and/or an infrastructure provider for an exchange
- *Entities Served*: Which, if any, standards/exchanges they serve (in the case of registry infrastructure providers)
- *Standards Accepted*: Which standards' credits are accepted on the registry (in the case of independent registries)
- *Transparency*: To what extent are listed credits and projects visible to third parties
- *Total credits registered*: The volume of voluntary credits registered since its launch
- *Fees*: Costs for issuing, registering, transferring, and/or retiring credits
- *Rules & Processes*: What steps are required for a credit to be issued and serialized

Most of these differences are summarized in Table 6. The table does not summarize the details of the rules and processes of each registry; for this information, we refer you to the standards and registries themselves. A variety of market players have highlighted the importance of acknowledging these details.

8.3 What's in a Listing? – An Overview of Registries

2008 saw the launch of several standard-specific registries, as well as the "revamp" of existing registries with new features and partnerships. The following section provides an overview of independent registries and registry infrastructure providers. See Section 7 on Standards and Section 9 on Exchanges for descriptions of standard- and exchange-specific registries.

8.3.1 Independent Credit-Accounting Registries and Registry Infrastructure Providers

APX [44]

APX is a privately-held energy and environmental markets infrastructure provider that hosts the registries of several voluntary carbon market standards. In 2008, it became the system behind the Climate Action Reserve and Gold Standard registries, as well as one of the registry providers behind the VCS Project Database. APX provides these registries using its Environmental Markets Depository system, which serves as the underlying technology for carbon offset and REC registries. The company also serves as the infrastructure provider of the North American Renewables Registry for compliant and voluntary REC tracking, purchasing, and retirement.

[44] Available online at http://www.apx.com/environmental/environmental-registries.asp.

Bank of New York Mellon Registry[45]
The Bank of New York's custodial registry was created in 2006 to account for Voluntary Carbon Standard Version 1 credits. The custody and registry system stores VCUs, assigns each a unique serial number and defines account ownership. The Registry does not issue Voluntary Carbon Standard Version 2 credits. It is separate from Bank of New York's recently launched Global Environmental Markets (GEM) platform, a custody and trade settlement platform for carbon credits in the voluntary and regulated markets.

BlueRegistry[46]
In tandem with VER+, TÜV SÜD created the BlueRegistry in July of 2007 to serve as a database of certified VERs and Renewable Energy certificates (RECs). Although the BlueRegistry accepts various voluntary carbon market standards, the majority of credits listed on the registry are from the VER+ Standard (also created by TÜV SÜD) and renewable energy certificates as Guarantee of Origin (GoO), according to the European Commission's national regulations, and TÜV SÜD Renewable Units (TRU) verified to TÜV SÜD's Generation EE Standard. Users do not have to create an account in order to view the registry and can search for projects by various criteria, including project proponent and tonnes available. In retirement and withdrawal list corresponding transactions are displayed and search by transaction ID number is available.

GHG CleanProjects Registry[47]
Launched in 2007, the Canadian Standards Association's GHG CleanProjects Registry was developed to list and de-list greenhouse gas-reduction projects that result in emissions reductions. Projects seeking to have their reductions serialized in the registry must be validated and verified according to ISO 14064-2/3 requirements for greenhouse gas-inventorying and -reporting. Once emissions reductions are third-party verified, they are eligible to be serialized and to become Verified Emission Reduction-Removals (VERRs). However, validation by a third-party and serialization of verified emissions reduction volume is not required for listing, although participants may attach a unique serial number to each VERR, representing one tCO_2e. Only ex-post credits (emissions reductions that have already occurred) are eligible for serialization. Users do not have to create an account to view the registry and may search by project or proponent name.

Regi[48]
Short for The Registry Company, "Regi" is operated by M-Co, a private company that works in electricity markets. Regi is a registry for carbon offsets that meet Regi's internal standards. The registry accepts only VCS and Gold Standard-verified VERs and "PRE-VERs," which it defines as offsets generated from projects eligible for the New Zealand government's Projects to Reduce Emissions (PRE) scheme before January 1, 2008, but it will consider other units on a case-by-case basis. PRE-VERs must meet the government scheme's requirements as well as JI project requirements. The registry is tailored to players in New Zealand's voluntary carbon market, although it considers foreign-account requests also on a case-by-case basis. Regi has a high level of transparency, and the general public can visit Regi's website and view the Certificate Summary Listing to find information on offset providers, project names, credit types and volume, and transaction status.

[45] Available online at http://www.bnymellon.com
[46] Available online at http://www.blue-registry.com
[47] Available online at http://www.ghgregistries.ca/cleanprojects/index_e.cfm
[48] Available online at http://www.ghgregistries.ca/cleanprojects/index_e.cfm.

Traceable VER Registry[49]
The Traceable VER Registry was created by the project-verification company TUV NORD in 2007 to serve as a registry for any "credible VER standard" and not just those verified by TUV NORD. Credits listed on the registry are then designated "T-VERs" for Traceable VERs. Apart from certain mandatory information, credit owners may choose which project information they would like to make public to potential buyers and which information to disclose only to certain clients. T-VERs may be credits verified to any standard and are not limited to TUV NORD as the verification entity, although all projects currently listed on the Traceable VER Registry have been verified by TUV NORD.

TZ1[50]
The TZ1 Environmental Registry Service provides registry platforms for a number of environmental credits, including carbon credits and biodiversity certificates from a commercial global conservation bank. TZ1 operates its own independent registry and also provides registry services for the VCS registry, the American Carbon Registry, Social Carbon, and the CCB Standard. The carbon registry includes an externally-audited retirement facility for VERs or Kyoto credits, and organizations listing information on the registry may choose the level of transparency in their accounts. TZ1 announced several partnerships with standards and exchanges in 2008 and early 2009 and was recently sold by the New Zealand Exchange to the financial firm Markit in early 2009.

8.3.2 Standard- and Exchange-Specific Registries

As noted in Section 7, standard providers are increasingly creating their own registry infrastructure or linking with infrastructure providers to issue and track credits. Likewise, many exchanges have created their own or linked with external registries. While the general concept of linkage is similar across registries, the set-up of the infrastructure systems and the rules governing each system vary between different standards' registries.

Table 7 summarizes some of the differences between standard- and exchange-specific registries.

8.3.3 Custodial Services

Bank of New York Mellon Global Environmental Markets Platform[51]
In May 2009, the Bank of New York Mellon (BoNY) expanded its services into a launch of the Global Environmental Markets (GEM) platform, a custody and trade settlement platform for carbon credits in the voluntary and regulated markets. The system is designed to allow clients a single entry point to manage all credits in their portfolio with the aim of lowering operational risks and increasing efficiency. The system is not a registry but instead will operate with registries and exchanges to support the simultaneous settlement of credit trades against payments. BoNY Global Product Specialist Dario Parente noted, "While exchanges are focused on linking buyers and sellers, we are focused on the buyers actually receiving their credits, and the suppliers receiving their money."

[49] Available online at http://traceablevers.mh5.projektserver.de
[50] Available online at http://www.tz1market.com
[51] Available online at http://www.bnymellon.com

Table 6: Independent Registries and Registry Infrastructure Providers

Registry or Infrastructure Provider	Market Position	Entities Served (in case of Infrastructure Provider)	Standards Accepted (in case of Independent Registries)	Transparency	VER-related Fees (US$ unless otherwise specified)[1]	Registry Start Date	Total Projects/VERs Registered [2]
APX	Infrastructure	VCS, Gold Standard (GS), Climate Action Reserve	N/A	Project info public; Account info public; Listing eligibility requirements clear	VCS Registry: Issuance: $0.05/t; VCSA Fee: €0.04/t; Transfer fee: $0.02/t; Annual subscription fee: $500; Retirement: Free. The Reserve: See entry for Climate Action Reserve in Table 7. GS Registry: See entry for Gold Standard Registry in Table 7.	The Reserve and GS: 2008; VCS: 2009	VCS Registry: 31 projects / 1.77MtCO_2e GS Registry: 313 projects / 0.99MtCO_2e The Reserve: 6 projects / 1.3MtCO_2e
Bank of NY Mellon	Independent Registry and Custodial Service Provider	Not applicable	VCS Version 1	No public info	Unknown	2006	Unknown
BlueRegistry	Quasi-independent registry	VER+ and others	VER+; Other standards that at least meet the VER+ Standard requirements	Project info public; List of account holders public; Listing eligibility requirements clear	Account opening: €550; Annual registration fee: €400/account; Transfer fee: €0.03/t; Retirement: €150 (<1,000t) or €150 + €0.03/t (amount >1,000t); Retirement certificate: free or €400 Issuance is free of charge.	2007	24 projects / 2.6MtCO_2e
Caisse des Depots	Infrastructure	VCS	N/A	No public info	Account creation: free; Transaction reporting: free; Account maintenance: free; VCU issuance: €0.04/t (for VCS)+ €0.05/t (for Caisse); Transfer fee: €0.02/t; Withdrawal of VCUs: free	2009	None
GHG Clean Projects Registry	Independent	Not applicable	ISO 14064-2/-3	Project information public; List of account holders public; Listing eligibility requirements clear	Account creation: CA$200; Pre-Validation and review: CA$250-$750; CA$0.05/t serialized.	2008	Serialized VERRs: 5.6MtCO_2e (not all are voluntary)

Regi	Independent	Not applicable	VCS, Gold Standard, JI, New Zealand "Pre-VERs"	Project info public; transaction info public; list of accountholders public ; listing eligibility requirements clear	Account creation: NZ$0; Credit listing: NZ $1-$1.50/unit; Transfer, Retirement, or Cancellation: NZ$1.50-$5/unit	2007	Unknown
TZ1	Infrastructure/Independent	VCS; American Carbon Registry; CCB Standards; Social Carbon; Plan Vivo	VCS, Social Carbon, CCB	Most project info public; some account info public; Listing eligibility requirements clear	TZ1 Meta Registry: Subscription fee $500; Annual fee (starting year 2): $100; Issuance: $0.08/t; Transaction: $0.05/t; Reporting: free; Retirement certificate: $200; Account closing: $150 See Table 6 for fee info on the standards registries powered by TZ1.	2008	TZ1 Meta Registry: 38MtCO_2e

Source: Ecosystem Marketplace, New Carbon Finance.
[1] *Fee information availability varies among standards; only publically available information is presented in this table.*
[2] *Total refers to the entire volume of VERs or projects registered during the lifetime of the registry as of April 2009, except where otherwise noted.*

Table 7: Standard- and Exchange-Specific Registries

Registry	Affiliated Standard/ Exchange	Registry Provider	Transparency	VER-related Fees (US$ unless otherwise specified)	Registry Start Date	Total Projects/VERs Registered*
American Carbon Registry	American Carbon Registry Standard/ TZ1	TZ1	Project info public; Account info public; Listing eligibility requirements somewhat clear	Transaction account: $500 (initial and annual); Retirement account: $1,000 (initial), $500 (annual); Additional accounts: $500/account; Transaction: $0.05-$0.14/t; Retirement: $0.14/t; Project de-listing; $0.015/t; Account closing: $150	Reduction registry: 1997; Credit-accounting registry: 1997	30.2MtCO_2e
Asia Carbon Registry	Asia Carbon Exchange	Internal	Account and project info not public; standards unclear	Unknown	2007	Unknown
Australian Climate Exchange Registry	Australian Climate Exchange	Internal	No project or account info public; Listing eligibility requirements somewhat clear	Account establishment: AU$300; Annual account fee: AU$200; Listing fee: AU$500/project; Registration fee (new credits from existing project): AU$150; Transfer/Retirement: AU$300/transfer or retirement; Certificate document issuance: AU$300	2007	0.15MtCO_2e
CarbonFix Registry	CarbonFix	TZ1	Project info public; Some account info public; Listing eligibility requirements clear	Subscription: free; Annual fee: free; Issuance: $0.05/t; Transactions: $0.02; Retirement certificate: free; Account closing: free	2009	1 Project /0.31Mt$C0_2$e (2008 only)
CCB Standard Registry	CCB	TZ1	Project info public; Some account info public; Listing eligibility requirements clear	Subscription fee: $500/account; Annual fee (starting year 2): $100/user; Issuance: $0.08/t; Transaction: $0.05/t; Reporting: free; Retirement Certificate: $200; Account closing: $150	2008	8 projects
Climate Action Reserve (Reserve)	Climate Action Reserve	APX	Project info public; List of account holders public; Listing eligibility requirements clear	Account setup: $500; Account maintenance: $500; Project submittal: $500/project; CRT Issuance: $0.15/t; Account transfer fee: $0.03/t; Retirement: free	Reduction registry 2003; credit-accounting registry 2007	1.3MtCO_2e

CCX Offsets Registry	CCX	Internal	Some project info public; Some account info public; Listing eligibility requirements clear	Offset registration fee: $12-$15/CFI ($0.12-$0.15/t); Offset deregistration: $24-$30/CFI; Forest carbon stock issuance: $6/CFI; Exchange trading: $0-$5/CFI per side; Block trades or buy-side of cash transactions: $25/CFI; Intra-company transfer: $5/CFI; EU transfers: $5/CFI; Sub-account maintenance (initial & annual): $250/account	2003	53.1MtCO_2e
Greenhouse Friendly Abatement Register	Greenhouse Friendly	Australian Climate Exchange	No project info public; No account info public; Listing eligibility requirements clear	Account establishment: AU$300; Annual account fee: AU$200; Listing fee: AU$500/project; Registration fee (new credits from existing project): AU$150; Transfer/Retirement: AU$300/transfer or retirement; Certificate document issuance: AU$300	2007	33 projects
Gold Standard Registry for VERs	Gold Standard	APX	Project info public; Some account info public; Listing eligibility clear	Account subscription: $500; Project registration: $0.05-$0.10/t; Issuance: $0.15/t ($0.10/t to GS, $0.05 to APX); Transfers: $0.01/t	2008	313 Projects
Plan Vivo Registry	Plan Vivo	TZ1	Project info public; Some account info public; Listing eligibility requirements clear	Subscription fee: free; Annual fee: free. Issuance: $0.05/t. Transactions: $0.02/t. Reporting: free; Retirement Certificate: free. Account Closing: free	2009	3 Projects / 0.18Mt$C0_2$e
Social Carbon Registry	Social Carbon Standard	TZ1	Project info public; Some account info public; Listing eligibility requirements clear	Subscription fee: $500/account; Annual fee: $100/user; Issuance: $0.02/t; Transaction: $0.05/t; Reporting: free; Retirement certificate: $200; Account closing: $150	2008	5 projects (2008 only)
Triodos Climate Clearing House Registry	Triodos Climate Clearing House	Unknown	Project and account info not public; Listing eligibility standards unclear	Unknown	2001	Unknown
VCS Registry System	VCS	APX, TZ1, Caisse des Depots	Depends on the registry provider	Issuance: €0.04/t + Registry-operator fees	2009	3.55 Mt$C0_2$e (1.77 MtC02e on APX; 1.78 MtC02e on TZ1; No tonnes yet registered on Caisse)

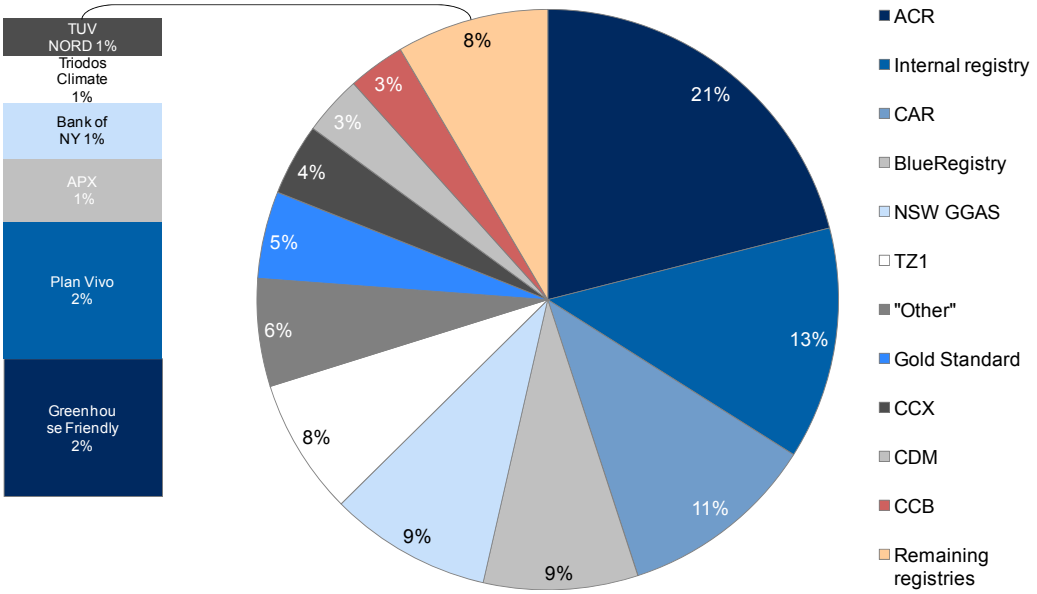
Source: Ecosystem Marketplace, New Carbon Finance.
[1]Fee information availability varies among standards; only publically available information is presented in this table.
[2]Total refers to the entire volume of VERs or projects registered during the lifetime of the registry as of April 2009, except where otherwise noted.

8.4 Registry Usage in 2008: A Closer Look

The rise of the registry has led to fierce competition between the different providers. To track the market share of different registries, we first asked suppliers to indicate the percentage of 2008 transacted credits that were listed in a registry and afterwards contacted registries to collect data on credits issued and transacted in their systems. Registries and registry operators that shared volume data or whose volume data was publically available included APX, the American Carbon Registry, TZ1, Asia Carbon Registry, the Climate Action Reserve, GHG CleanProjects, the Australian Climate Exchange Registry, BlueRegistry, and the CCX. In addition to data shared by registries, supplier responses were weighted according to their transaction volumes in order to show the percentage of credits tracked on each registry.

Figure 30 illustrates survey respondents' registry usage in 2008. The figure does not represent transaction information gathered from the registries themselves, because it is not always possible to identify credit *transactions* across the registries (rather than credits registered). Additionally, the figure depicts only those volumes tracked in a registry in order to depict market shares occupied by the various registries; it does not include unregistered (i.e. not tracked in any registry) transaction volumes.

Figure 30: Transaction Volume by Registry Utilized, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1)Based on 101 survey respondents

Note: This figure excludes the volume of credits (67%) of OTC credits that were not tracked in registries.

In 2008, 33% of credits transacted were tracked in a third-party or internal registry (29% only third-party). Note that these figures are different from those shown in the chart above as the chart only displays those volumes that were actually put into a registry, that is it omits 67% of the volumes transacted in the marketplace in 2008. While at first glance this may seem surprising, given the increased market actor emphasis on the importance of third-party registries, it could be explained by the delay in the launch of the VCS Registry System, which may have caused suppliers to hold off registering credits

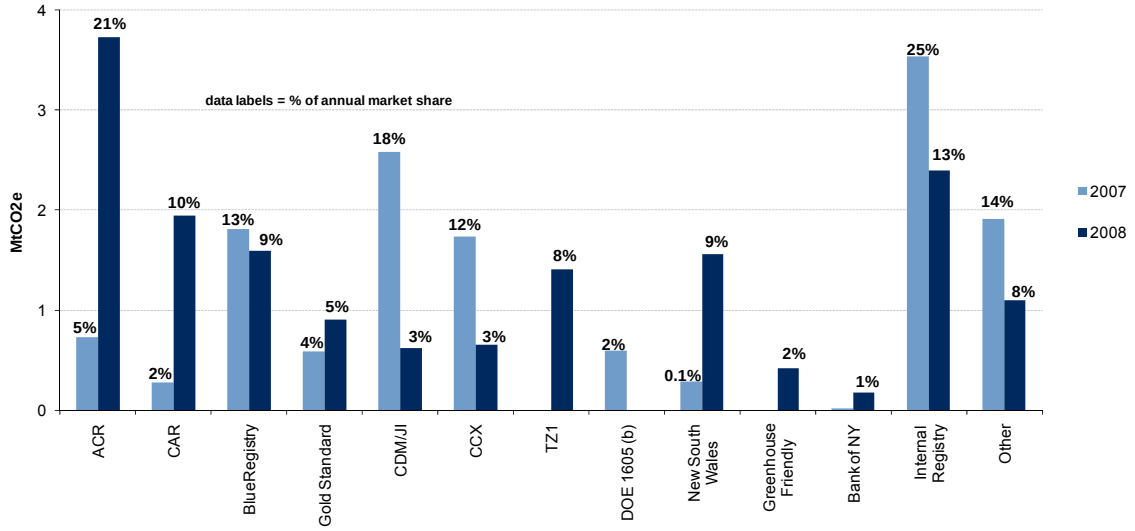
until the VCM Registry System was launched in March 2009. The large share of the standards market claimed by VCS (48%) in 2008 supports this explanation.

Unlike last year when suppliers' use of registries was disjointed with standards, this year use of registries and standards increasingly matched up due to formal linkages. Reiner Musier, Vice President of market infrastructure provider APX, observed that his "clients are increasingly focused on a smaller number of high-quality standards…and are looking for greater efficiency in managing these portfolios across voluntary and compliance markets."

The American Carbon Registry tracked more credits than any other standard's registry in 2008, claiming almost one-quarter of those tracked in a registry (21%). As Figure 31 indicates, this represents a tremendous increase over the American Carbon Registry's share of the 2007 market (5%). It should also be mentioned that the ACR's dominance is potentially due to the fact that the registry is highly transparent and we obtained more transaction information for the ACR.

After the American Carbon Registry, the Climate Action Reserve took the second-highest volume (11%) of third-party registries, followed by the NSW Greenhouse Registry and the BlueRegistry (both 9%). The significant growth in market share claimed by CAR (up from 2% of the OTC market in 2007) is related to the California Air Resources Board's endorsement of the Reserve's offset project protocols as suitable for compliance use under AB 32. This endorsement immediately converted CAR into a pre-compliance credit-accounting registry not only for California's compliance scheme, but also for the upcoming Western Climate Initiative regional cap-and-trade scheme. The growth in transaction volume listed in the NSW Greenhouse Registry is explained, in part, by the larger number of Australian offset suppliers that participated in this year's survey, as well as by pre-compliance purchases of NGACs (which must be listed on the NSW GGAS Registry) in anticipation of the upcoming Australian compliance scheme that is scheduled to launch in 2011.

Figure 31: Transaction Volume and Market Share by Registry, OTC 2007 vs. 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) 2008 figures based on 101 survey respondents

Figure 31 compares the market share captured by each of these registries in 2007 and 2008.

The market share captured by the CDM/JI registry fell markedly from 18% of the OTC market in 2007 to only 3% of the market in 2008, in line with the decline in its standard utilization, which also fell from 16% to 3%. The percentage of the market claimed by BlueRegistry, CCX, and DOE 1605(b) also fell. BlueRegistry lost market share from 13% in 2007 to 9% in 2008, consistent with the reduced share claimed by VER+ amongst the standards (the only type of voluntary offsets listed by BlueRegistry are VER+ credits). The decrease in OTC transactions of CCX offsets may be explained by the development of third-party standards and registries for the OTC market. The disappearance of the DOE 1605(b) relates to the fading away of this registry as a credit-accounting registry in favor of the Climate Registry and Climate Action Reserve. DOE 1605(b) was created by the U.S. Department of Energy as a voluntary emissions-reporting registry and was used by some companies to report saleable emissions reductions.

Note that in Figure 30 and Figure 31, "other" refers not only to the write-in responses to our survey, but also to a number of registries that we included among the options and which took very small market shares (<0.5%) individually. These standards include: the GHG CleanProjects Registry, Regi, the Asia Carbon Registry, and the Australian Climate Exchange Registry.

8.5 Exchanges: Bidding the Buyers

Outside of the CCX, voluntary offset transactions have operated outside of any formal exchange—the reason we have deemed this the "Over-the-Counter" (OTC) market. Recently, however, several exchanges made an entrance into this arena. Within the marketplace, the term "exchange" is utilized to describe a variety of products. The following list details exchanges operating in the voluntary sphere—that is, exchanges that actively list and transact carbon credits certified to a voluntary standard. While voluntary purchasing of compliance-grade credits may occur on the official exchanges of various emissions-trading schemes, those transactions are impossible to trace from the registry side and are therefore not included in this discussion.

8.5.1 Current Exchanges for Voluntary Carbon Credits

Asia Carbon Exchange (ACX-change)[52]

Asia Carbon Global launched the trade of VERs on its Asia Carbon Exchange platform in May 2007 and conducted the first auction in June 2007. The exchange lists VERs tracked on an internal registry and that have been validated to VCS, VER+, or Gold Standard protocols. In 2008, 144,640tCO_2e moved across the exchange at an average of €3.7 with the bulk of credits flowing from VCS-validated renewable energy projects in India. In 2008, ACX also saw the launch of the "Carbon Nil" program, which integrates carbon-footprint auditing with verified and registered offsets purchased across the exchange to create a one-stop-shop for companies looking to achieve carbon neutrality.

[52] Available online at: http://www.asiacarbon.com/Carbon_Trading.html

Australian Climate Exchange (ACX)[53]

Australian Climate Exchange was created in 2007 to respond to growing demand for voluntary carbon offset products in Australia. The first emissions trading platform in Australia, the exchange initially offered only Greenhouse Friendly VERs, but has since expanded, listing credits from multiple international verification standards. In 2008, 12,750tCO_2e were transacted across the exchange at an average price of 10.40AU$.
Australian Climate Exchange maintains two internal registries to support the Exchange: the first is restricted to Greenhouse Friendly VERs, while the second houses "international" offsets from multiple standards and currently lists credits verified to VER+ and the VCS. The second registry also has links to registries around the globe to give Australian companies access to CERs and VERs from international projects. In 2008, 72,454tCO_2e were registered across the two registries.

Chicago Climate Exchange (CCX)[54]

As noted in Section 3.1, the Chicago Climate Exchange is the exchange platform for the first cap-and-trade system in North America and is the heart of the largest voluntary emissions-trading scheme in North America. The exchange is exclusive to just CCX members. While not all transactions of CFIs take place through the exchange—occurring rather as cash deals or bilateral OTC transactions—the volume of transactions on the exchange has continued to grow rapidly with 2008 numbers up over 350% from 2007. As of April 2009, 92 companies were Full Members of the registry and 52 were Associate Members.

The Chicago Climate Exchange maintains an internal registry that tracks all CFIs from allocation or origination (CFIs represent credits from both allocations and offset projects) across the exchange and eventually to retirement.

Climex[55]

Launched in 2003, as an emissions-trading auction platform, Climex entered into the voluntary carbon market in October 2007 as the first platform to execute VER auctions with the auction of 350,000 VERs (a mixture of pre-CDM VCS II from three projects accredited to the VCS standard) on the Climex Auction Platform. In 2008, Climex expanded its offerings as a voluntary carbon market infrastructure provider: auctioning over 215,000tCO_2e, hosting the first exchange-traded transaction of Gold Standard credits, and linking with BlueSource registry to facilitate VER credit-tracking from seller to buyer—becoming the first exchange to integrate registry transfers into VER auctions. Climex has also announced plans to develop a spot market exchange, similar to those provided for CERs and EUAs for the EU ETS, for voluntary carbon VERs.

World Green Exchange[56]

While Climex came to the voluntary carbon market from the EU ETS compliance markets in Europe, the World Green Exchange grew out of World Energy's experience with the electricity, natural gas and Renewable Energy Credit (REC) markets in North America. The exchange launched in January of 2008 on the back of early successful exchange auctions of VERs, RECs, and Alberta offsets. The World Green Exchange has since provided the platform for the seminal Regional Greenhouse Gas Initiative

[53] Available online at: http://www.climateexchange.com.au
[54] Available online at: http://www.chicagoclimateexchange.com
[55] Available online at: http://www.climex.com/
[56] Available online at: http://www.worldenergy.com/wgexchange/default.cfm

auctions and partnered with Gold Standard, market infrastructure provider TZ1, and the Canadian Standards Association (developer of the GHG CleanProjects Registry). After using 2008 to build up volume on the exchange, the World Green Exchange rebranded itself as a "shopping mall" for carbon credits allowing a detailed view of all available projects—searchable by over ten criteria—including supplier, commodity type, certification standard, volume, vintage, and price. Additionally, key documentation specific to each project, such as the project design documents, verification reports and contracts, is attached to each project record.

8.5.2 Upcoming Exchanges for Voluntary Credits

Tianjin Climate Exchange[57]

In October of 2008, Climate Exchange Plc (the parent company of the Chicago Climate Exchange) announced the launch of the Tianjin Climate Exchange as a joint venture with The China National Petroleum Company and the Tianjin Property Rights Exchange. The exchange, set to begin operation some time in 2009, will initially transact credits for pollutants such as SO_2 and Chemical Oxygen Demand (COD). The exchange has announced plans, however, to expand quickly into transacting CERs and VERs.

[57] No website yet launched.

Table 8: Exchanges in the Voluntary Carbon Market

Exchange	Host Company	Credits Traded	Formal affiliations with voluntary standards, registries, schemes	Launch date of VER Trading	VER-related Fees (US$ except where otherwise specified)
Asia Carbon Exchange	Asia Carbon Global	VERs (VCS, VER+, or Gold Standard only)	Unknown	Unknown	Unknown
Australian Climate Exchange	Australian Climate Exchange	Australian RECs, VERs (VCS, VER+, Greenhouse Friendly only)	Greenhouse Friendly, VER+, VCS	2007	Brokerage fee: 0.75% of total transaction value (min. AU $75.00);
Chicago Climate Exchange	Climate Exchange PLC	CCX CFIs, RGGI futures, CRT futures, U.S. GHG compliance futures, REC futures (vol. & compliance), Dow-Jones Sustainability Index futures	Climate Action Reserve, Regional Greenhouse Gas Initiative	2003	Exchange trading: $0-$5/CFI per side; Block trades or buy-side of cash transactions: $25/CFI; Intra-company transfer: $5/CFI; EU transfers: $5/CFI;
Climex	Climex	EUAs, CERs, ERUs, RECs, VERs (multiple standards)	None	2007	Auctioneer: 0.5-1.75% of transacted amount; Buyer: 1-1.75% of transacted amount.
Tianjin Green Exchange	Climate Exchange Plc and The China National Petroleum Company	Various air pollutants, CERs, VERs	To Be Determined	Upcoming	To Be Determined
World Green Exchange	World Energy Solutions, Inc.	RECs, RGGI, VERs (multiple standards) , VERRs (Canada's GHG CleanProjects Registry), Alberta Offsets	TZ1, Gold Standard, Canadian Standards Association (GHG CleanProjects Registry)	2008	Brokerage fee: 1-1.5% of total transaction per side

Source: Ecosystem Marketplace, New Carbon Finance. Note: Information is accurate as of April 2009.

9 Voluntary Market Customers

Summary Points:

- Overall, private firms continue to purchase the bulk of offsets (at least 66% of volume), with purchasing for investment/resale purposes now the largest overall motivation (35%) instead of retirement (29%).
- Suppliers designated only 1% credits sold specifically to pre-compliance buyers. It is likely that a significant number of credits purchased for resale may be aspiring credits for final pre-compliance purposes.
- Voluntary purchasing by NGOs has decreased, from 13% in 2007 to 1% in 2008, as well as individuals' purchases, from 5% to 2%. This could represent a reduced interest in voluntary offsetting, an assumption that corporations are bundling offsets with their purchases, as well the onset of the recession in 2008.
- This year's results again confirmed that a compliance market does not eliminate the voluntary carbon market with European buyers purchasing over half (53%) of volumes, up from 47% in 2007. Given the non-existence of a large compliance market, the United States was responsible for both the greatest demand (39%) and supply (28%) in the market.
- Similar to previous years, sellers continue to perceive that Corporate Social Responsibility (CSR) and Public Relations/Branding are the two driving forces for voluntary purchases. Although many analysts perceive pre-compliance buying as a dominant driving force, the results of our survey repeatedly indicate that pre-compliance remains secondary to the pure voluntary market.

While the previous sections focused on the supply side of the market, this section covers the other side of the equation, demand. The voluntary carbon markets were created to service entities choosing to voluntarily offset their emissions.

Over the last few years, a clear trend has been that voluntary buyers have become increasingly savvy. Anne Hambleton of Native Energy described, "A new era of carbon literacy dawning." In a market where the story behind the credit is often crucial, suppliers noted that buyers now increasingly ask for specific project types, locations or standards. Perhaps in response to negative press, but more likely the result of increased citizen and corporate understanding of climate change and efforts to abate it, suppliers reported a more highly-educated customer base in 2008. Adam Stern, Vice President for Policy and Strategy for offset retailer TerraPass, noted, "Our customers understand the basic principles of real, additional, and independently verified. Interest in transparency is also very high. Our customers want to see the details of our entire portfolio of projects."

To gain insight into the demand-side of the market, we asked suppliers about the sectors, locations, and motivations of their off-takers.

9.1 The Carbon Conscientious Consumer: Who's Buying?

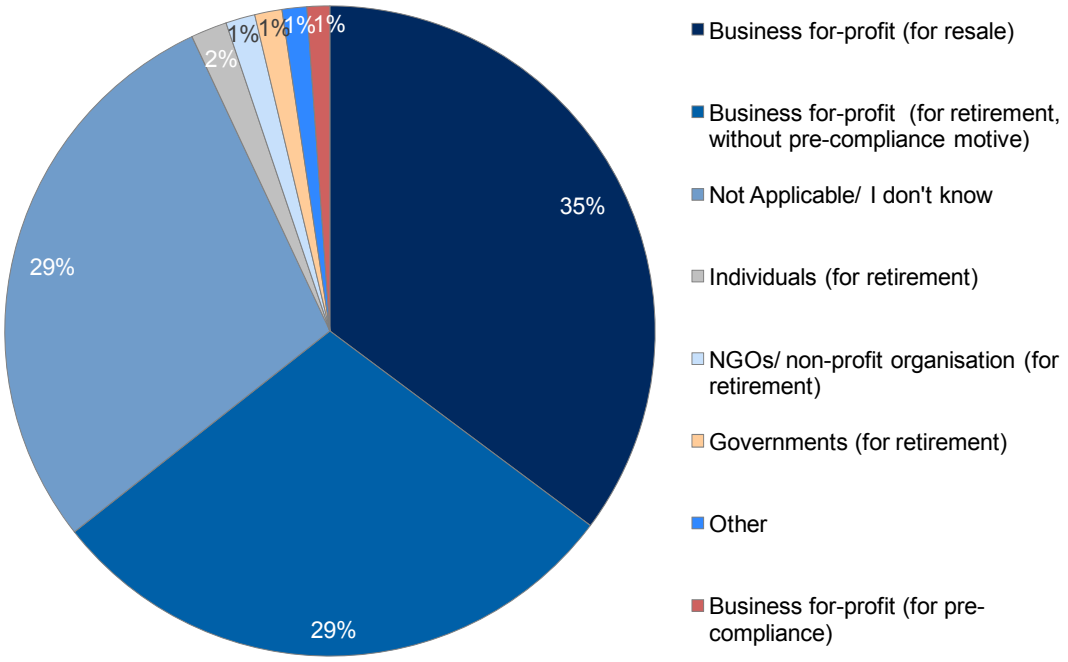
A wide variety of organizations as well as individuals produce the demand for carbon offsets. To identify the types of customers purchasing offsets, survey respondents categorized their customers by the percentage of credits sold. This year they were also

given an option to indicate, if they were unsure of the nature of the entity purchasing the offsets.

Options listed were:

- Business for profit (for retirement, without pre-compliance motive)
- Business for profit (for resale)
- Business for profit (for pre-compliance)
- Governments (for retirement)
- NGOs/nonprofit organizations (for retirement)
- Individuals (for retirement)
- Other
- I don't know

Figure 32: Transaction Volume by Type of Buyer, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 107 survey respondents

In an effort to isolate expectations for future compliance markets, in this year's survey we added the "business for profit (for pre-compliance)" category as well as an "I don't know"-option. These changes make direct comparisons between 2008 and previous years more difficult, but we can still identify some notable trends.

In 2008, most credits were purchased by intermediaries (35%), i.e. with plans to resell the credits in the future (for resale). Although only 1% of the total transaction volume was reportedly flowing directly to pre-compliance buyers, a proportion of the investment credits may eventually also end up with pre-compliance buyers. This may be confirmed by the higher share of the investment category, which relative to last year seems to be in line with the increased importance of the pre-compliance market.

The percentage of businesses purchasing credits for retirement dropped from a share of 50% in 2007 to 29% of credits purchased in 2008. It is possible that part of this market share was lost to the unknown category—suppliers and brokers could not categorize 29% of credits transacted. Nevertheless, part of this unknown category may also end up as pre-compliance, and it is therefore near impossible to determine, where these credits may eventually end up.

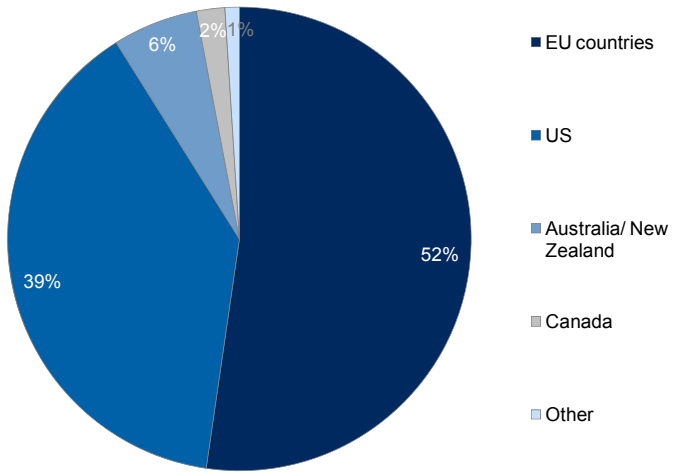
In 2008, we saw a reversal in the strong non-governmental organization (NGO) purchasing that characterized 2007. This year, NGO-purchasing represented only 1% of the total volume, a significant reduction from the 13% of volume that was purchased by not-for-profit entities in 2007. This seemed surprising as many NGOs have announced plans to purchase offsets as one tool "to walk the talk". It may reflect an emphasis on using funds to reduce emissions directly, mixed sentiments on offsetting and budget cuts. Government helped the public sector gain some market share, rising from less than 0.5% in 2007 to 1% of this year's volume.

Individuals seeking to offset their personal carbon footprints shrank as a percentage of the total transaction volume, down from 5% (1.26MtCO_2e) in 2007 and 2006 to 2% (0.76MtCO_2e) in 2008. In general, due to the relatively small size of each transaction, individuals' offsetting represents a small percent of the market. The decrease in individual purchases could be a response to customer expectations that the corporations they support are bundling carbon offsetting in their goods and services, but could also represent a reduced interest in voluntary offsetting on the back of negative media publicity and the onset of the recession in 2008. It was also difficult to track credits sold to individuals through companies, such as airlines, whose primary business model is not supplying offset credits.

9.2 Customer Location

In 2008, the United States and the European Union remained the dominant source of demand with New Zealand and Australia coming in as distant third. Over half (53%) of volumes went to European buyers, up from 47% in 2007—a strong signal that the voluntary offset markets fill a unique niche alongside mandatory compliance trading schemes. A little over 40% of transactions were driven by North American demand with both the greatest amount of supply and demand hailing from the United States: 39%, up from 34% in 2007. Demand has also remained strong from Canada, Australia, and New Zealand, although their market share dropped slightly from 11% in 2007 to 8% in 2008.

Figure 33: Transaction Volume by Customer Location, OTC 2008[1]



Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 110 survey respondents

The “rest of the world” constituted less than 1% of demand. Scattered “carbon neutral” programs, especially geared towards the tourism sector, were launched in Africa, Asia, and Latin America. However, this year’s results confirm again that demand for these “luxury goods” remains limited in the developing world. Also, it should be noted that the 8% in the “unknown” category in 2007 has been eliminated and may have ended up in the European and North American categories.

9.3 Customer Motivations

To further understand the incentives of voluntary buyers, we asked respondents to rank (from 1-5, 5 being the most important) the purchasing motivations of their customers. The list of proposed responses in this year’s survey varied slightly from last year’s, dropping the option of “seller advertising” and adding the option of “offset purchase easier than other emissions reductions”.

The options were as follows:

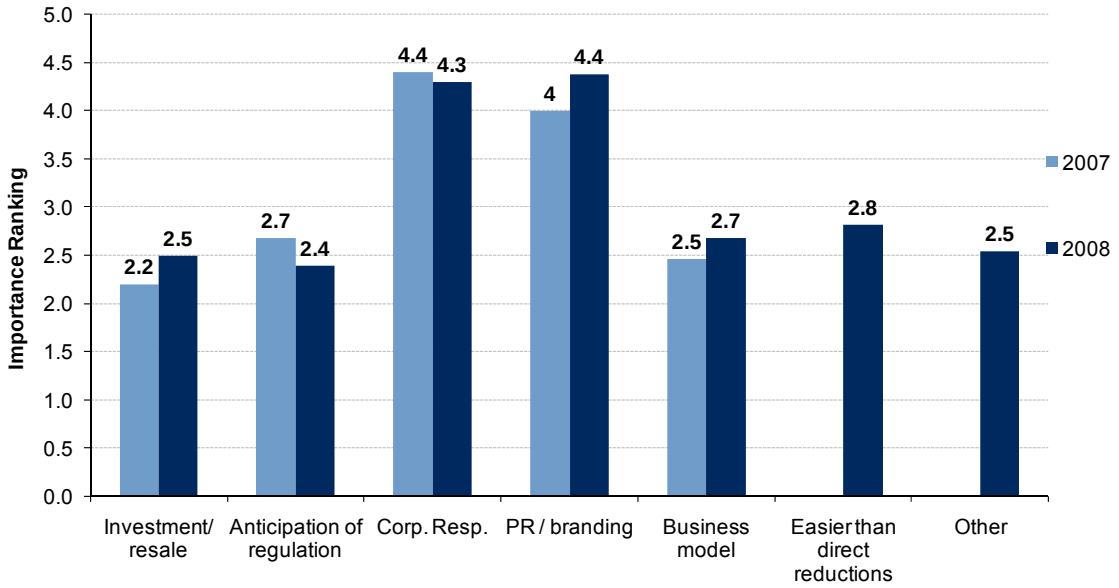
- Investment/Resale
- Anticipation of Regulation (i.e., pre-compliance)
- Corporate Social Responsibility (CSR)/Environmental Ethics
- Public Relations/Branding
- Anticipation of Regulation
- Climate-change affected business model (such as re-insurance agencies or ski resorts)
- Offsets easier than other reductions
- Other (write-in)

The results of this question are shown in Figure 34. Consistent with the results of last year’s survey, suppliers indicated that “Corporate Social Responsibility” and “Public Relations/Branding” were by far the primary motivations behind voluntary market transactions, as companies sought to offset emissions for goodwill, both of the general public and their investors.

The new option “offset purchases are easier than direct emissions reduction” ranked as the third greatest motivation. Purchasing offsets is often perceived as easier or cheaper than making direct emissions reductions, especially once a company has harvested its “low-hanging” fruit such as improved energy efficiency. It must be noted, however, that in this rather subjective category, the ranking difference between the four lowest categories cannot be considered significant.

Although many analysts perceive pre-compliance buying as a dominant driving force in the voluntary market, the results of our survey have repeatedly indicated that pre-compliance motives (as indicated by “investment/resale” and “anticipation of regulation”) remain secondary to those of the pure voluntary market (companies/individuals offsetting their emissions). This indicates that the pure voluntary market remains larger than the pre-compliance market and is confirmed by the fact that North American and Australian supply is only 34% of total voluntary transactions in 2008 (the only volumes that might be considered as pre-compliance).

Figure 34: Customer Motivations[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1)Based on 136 survey respondents

However, pre-compliant demand is expected to pick up this year, and some project development and brokerage firms have noticed more demand in 2009 motivated by anticipation of regulation. Lauren Kimble of Blue Source LLC commented, "We're seeing growth in buyers' pre-compliant demand from both emitters and from other parties wanting to take a position in the market, while the pricing is where it is, because of the regulatory uncertainty." Others have commented that direct pre-compliance buyers, such as utilities, are not willing to purchase offsets until they have more certainty the credits would be viable in a regulated scheme. "These final pre-compliance buyers are ultra-conservative buyers. Why risk it? When utilities are forced into the game, then they will start buying."

Respondents were also given a write-in, "other" option to further explain their perceptions of customer motivations. These comments revealed that, especially among final retailers, customers are often motivated by a personal sense of responsibility for their individual carbon footprint. Other resellers noted that companies were purchasing offsets as a way of educating both themselves and their employees about the cost of emissions in a tangible way, using offsets as a "teaching tool".

10 What Tomorrow Brings: Future Projections

Summary Points:

- Respondents expect the global voluntary markets to increase to 257MtCO_2e in 2012, 347MtCO_2e in 2015 and 476MtCO_2e in 2020.
- Survey participants again underestimated the growth of the voluntary carbon markets in 2008, projecting transactions of 97MtCO_2e rather than the 124MtCO_2e observed.
- With respect to standards, most participants intend to use the VCS (52% of suppliers that responded to our survey intend to use this standard), followed closely by CDM (34%), the Gold Standard (32%), the Climate Action Reserve (28%) and the Community, Climate & Biodiversity (CCB) Standards (27%).
- Registries generally follow standards, with the most popular choices being the Climate Action Reserve (23% of suppliers that responded to our survey intend to use this registry), the Gold Standard (23%), APX (21%), TZ1 (21%), and the CDM/JI registry (19%). The popularity of TZ1 and APX is consistent with a strong interest in the VCS, as these market infrastructure providers both provide the back-end support to the VCS Registry System as well as several other standards.

10.1 The Here and Now: 2009

At one level, the first five months of 2009 have been a frenzy of activity for the voluntary carbon markets: registries, standards, and exchanges have announced a flood of new products and partnerships; conferences are sprouting almost weekly across the globe; and on the ground, projects continue to pump out millions of VERs. At another level, carbon market stakeholders, both in the regulated and voluntary markets, are holding their breath as they wait out financial market and regulatory uncertainty.

The voluntary markets—like almost every other global commodity market—have declined under the influence of the global financial crisis, which has limited investment in offset projects and cut firms', governments', and individuals' discretionary spending budgets. Many offset project developers complained of "frozen finance" referring to just how illiquid the market has become. As far as transactions are concerned, most suppliers describe a current environment where corporate voluntary buyers who have committed to emissions reductions continue to purchase offsets, but the rate of new buyers entering the market has slowed.

According to New Carbon Finance's Voluntary Carbon Index (VCI)[58], roughly 7MtCO_2e were transacted in the first quarter of 2009, down 50% from the 2008 quarterly average quarterly tracked in this study. Also, in the first quarter of 2009, the CCX transacted only 17.0MtCO_2e as opposed to 19.7MtCO_2e in the first quarter of 2008, a decline of 14%. Prices have seen similar decreases with OTC prices averaging \$4.90/tCO_2e as of Q1 2009 and the CCX currently trading at \$1.20/tCO_2e.

[58] Please go to www.newcarbonfinance.com and visit the free reports section to view the VCIs.

Whether in a state of hyperactivity or hibernation, most market suppliers have an eye on the horizon. Hence, we asked respondents not only about their actions last year, but also about their plans and predictions for the future.

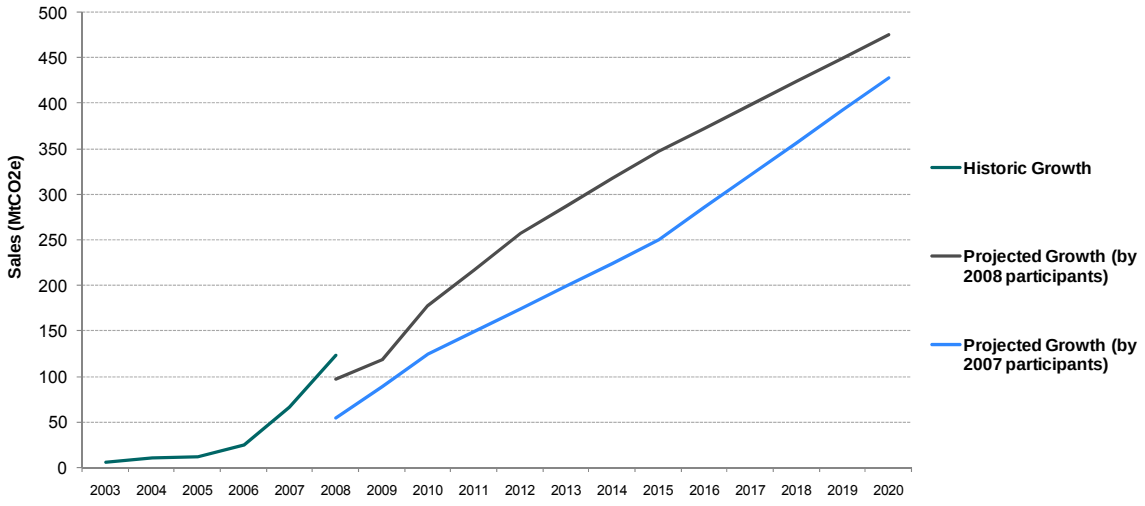
10.2 Supplier-Projected Size & Volume

Survey respondents were asked to project the size of the voluntary markets through to 2020, and 84 respondents were willing to quantify their vision of the future (see Figure 35). On average, suppliers projected an average annual growth of 15% per year from 2009 through 2020. Not surprisingly, the 2009 growth rate projected by participants is only 21% higher than the 2008 volume– or 118MtCO_2e in 2009 –which is particularly low relative to the average historic growth rate of 95% (2003-2008) and is even less than the market transacted in 2008.

Over the past three years, respondents' predictions have been significantly more conservative than actual numbers tracked. Like last year, respondents in 2009 were conservative in their estimates compared with actual market growth rates tracked by this report since 2006, which were nearly 150% in 2007 and nearly 100% in 2008. In 2008, survey respondents projected that 2008 would transact 53MtCO_2e, or 134% fewer tonnes than the 2008 market actually traded (124MtCO_2e). This year, survey respondents predicted that 2008 would transact 97MtCO_2e—more accurate, but still 28% smaller than the actual Volume.

Suppliers' projected volume in 2009 is 118MtCO_2e, which is still an increase in participants' eyes (118 versus 97MtCO_2e), but is actually less than the market transacted in 2008. For obvious reasons, market participants expect there to be a lull in activity for 2009, as the global economic crisis will impact both project investment and VER demand. Growth is expected to pick up again in 2010, albeit at a gradually regressive pace than before 2008. Using these estimates, the global voluntary market is expected to trade 347MtCO_2e in 2015 and 476MtCO_2e in 2020.

Figure 35: Supplier-Projected Growth in the Voluntary Carbon Markets[1]



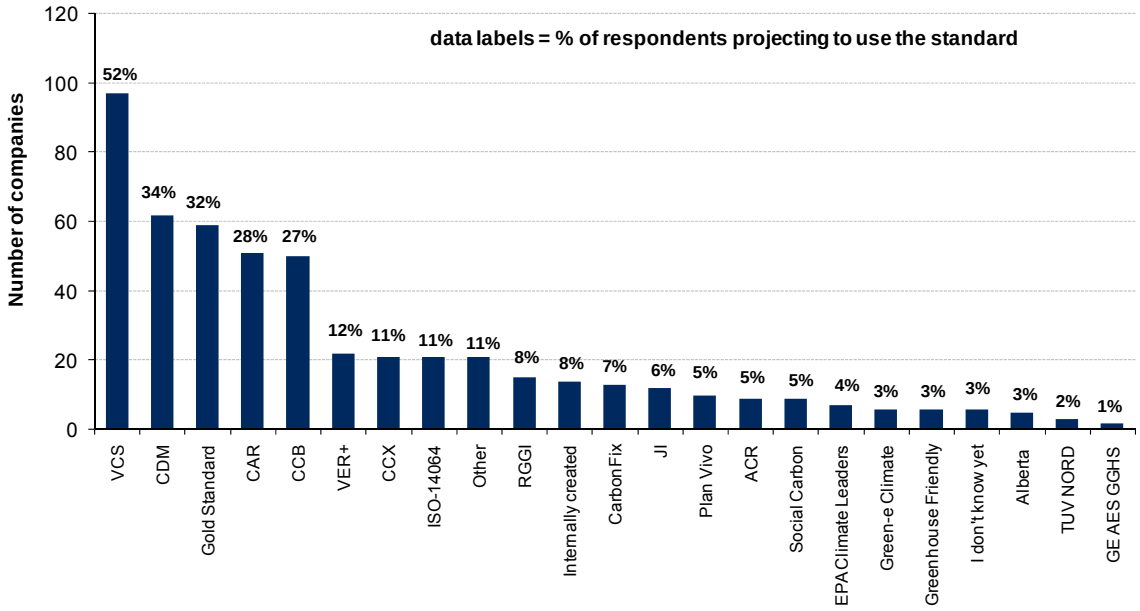
Source: Ecosystem Marketplace, New Carbon Finance.(1) Based on 136 survey respondents

10.3 Future Standard Utilization

In addition to the size of the voluntary market in upcoming years, we also asked participants to indicate which third-party standards they intend to use in 2009.

Suppliers were given the option of selecting an unlimited number of standards from a total of 21 options as well as the option to select "internally created standard" or to write in the name of one that had not been included on our list. Each respondent was given equal weight regardless of its transaction volume, and the percentages in Figure 36 reflect the share received by each standard of the total number of survey participants who answered this question. For instance, of the 152 respondents who answered this question, 79 companies or 52% of the total intends to use the VCS during 2009. Note that three of these standards (Alberta Offset Protocol, CDM, RGGI) are technically standards for regulatory offsets, although offsets generated under these schemes have been sold into the voluntary OTC market in the past.

Figure 36: Standards Suppliers Intend to Use in 2009[1]



Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 152 survey respondents

More suppliers intend to use the Voluntary Carbon Standard (VCS) than any other standard in 2009. In 2007, suppliers also reported the VCS as their most-preferred standard for use in 2008, which proved to be correct given the standard's 48% market share this year. About 34% of suppliers indicated they will utilize the CDM in 2009, 32% the Gold Standard, 28% the Climate Action Reserve, and 27% the Community, Climate and Biodiversity (CCB) Standards.

The continued popularity of the VCS is consistent with its increasing market uptake in 2007 and 2008. The high preference for CCB Standards is presumed to be due to the increased interest in "layering" multiple-benefit standards on top of accounting standards

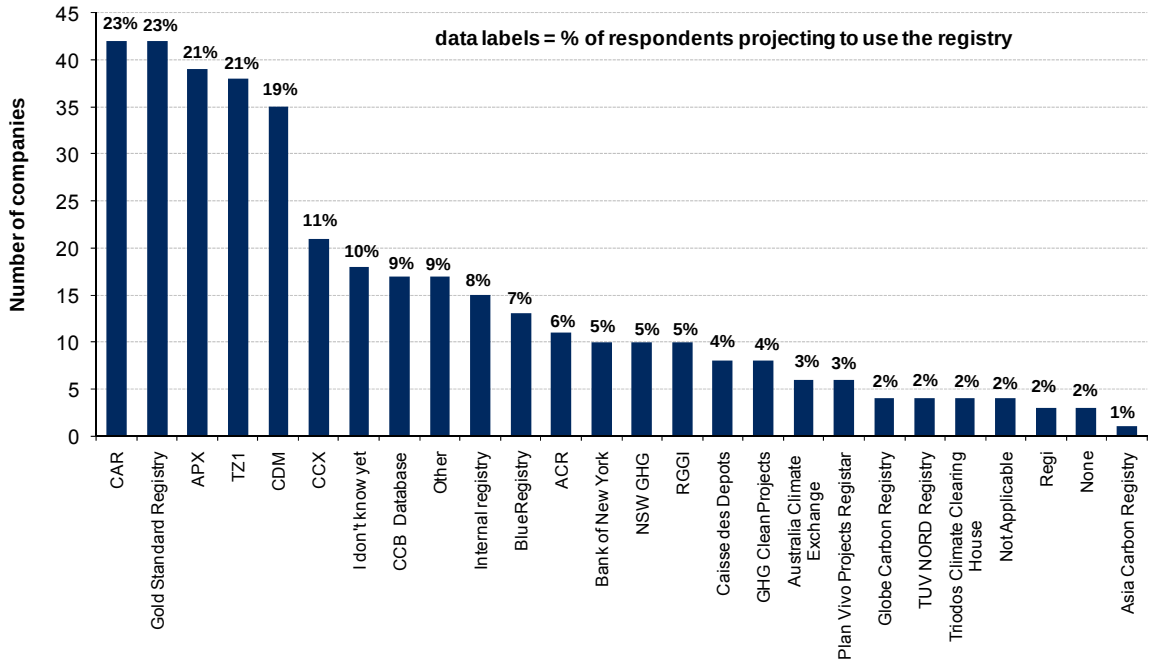
(CCB is not a carbon-accounting standard but rather a project design and multiple-benefit validation standard). The greater interest in CAR is not surprising, as the Climate Action Reserve was dubbed a "U.S. pre-compliance" standard when the California Air Resources Board endorsed some of its protocols for use under California's cap-and-trade scheme. In early 2009, together with the RGGI protocol, CAR also met the criteria for early-actor offset crediting under a potential U.S. compliance scheme as outlined by the Waxman-Markey draft bill. The interest indicated in the CDM is likely to be the result of continued interest in generating VERs from projects awaiting CDM registration.

Notable differences in suppliers' responses between 2007 and 2008 include a significantly greater preference for the future use of CDM and CAR in 2009 and a significant decrease in the intended use of VER+ and Greenhouse Friendly in 2009—consistent with a sizeable decrease in the market share of VER+ between 2007 and 2008 and the impending end date of Greenhouse Friendly in 2010.

10.4 Future Third-Party Registry Utilization

Since market uptake for registries is relatively new, we also asked market suppliers which registries they planned to use in 2009. Suppliers were given the option to select an unlimited number of registries from among 24 options of third-party infrastructure providers, independent registries, and standard- and exchange-registries, as well as the option to select "internal registry" or to write in the name of one that had not been included on our list.

Figure 37: Registries Suppliers Plan to Use in 2009



Source: Ecosystem Marketplace, New Carbon Finance. (1) Based on 146 survey respondents

As Figure 37 shows, the most popular choices were the Climate Action Reserve, the Gold Standard registry, the APX registry, TZ1, and the CDM/JI registry. As for standards'

registries, the Reserve, Gold Standard, VCS, and CDM/JI registries' popularity is consistent with these standards' intended future utilization as depicted in Figure 37. The popularity of TZ1 and APX is consistent with a strong interest in the VCS, since these registries both serve the VCS as well as several other standards.

10.5 Other Projections

In 2009, we expect the voluntary markets to become even more clearly bifurcated between pure voluntary and pre-compliant supply and demand, as the world comes to more clearly understand which offset credits could qualify for future compliance requirements (U.S. federal, Canada, Australia, California, regional initiatives, and the international post-Kyoto market). Although some pre-compliance demand existed in 2008, it is expected to grow in 2009 and beyond.

In the medium term, as the global economy digs itself out of this economic downturn, VER project development and voluntary offset-purchasing will pick-up again, although we may see a lack of new entrants in pure voluntary market in 2009 and 2010, as companies re-evaluate their environmental responsibility commitments in light of tightened budgets. Pre-compliance buying is expected to fill some or all of this void, becoming an important driver of demand in the voluntary markets for the next couple of years. The degree to which this happens, however, depends on whether and how governments accept voluntary emissions reductions through offset projects before, and concurrent with, the enactment of compliance schemes.

In the long-term, as the scope of emissions trading expands in the EU ETS and the global compliance market, new cap-and-trade schemes are launched, a chunk of both offset projects and buyers now rooted in the voluntary markets will transplant to the regulated markets. However, the potential for voluntary offset projects and purchases is still nearly limitless given the large emissions problem that we are facing worldwide. Moreover, as seen in Europe, the existence of a compliance regime does not necessarily mean the disappearance of the voluntary offset market.

The voluntary carbon markets are just one of dozens of mechanisms for reducing greenhouse gas emissions. We believe the growth of this market highlights the diversity of tools needed to reduce GHG emissions; a push from consumers moving at a more progressive rate than government; and the range of efforts needed for markets to actually become a viable mechanism for conservation. In context of the current political environment, even in the midst of a financial recession, in 2009 the voluntary carbon markets will undoubtedly continue to transact credits and mature--- while designing the edge of the carbon market frontier.

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TZ1 (www.tz1market.com) is designed specifically for environmental markets and financial activity, and the leading "meta registry" dedicated to supporting emerging environmental markets with unique and flexible financial markets-based infrastructure. Providing secure, robust, transparent and automated registry services for environmental assets (including carbon, biodiversity, water quality and conservation banking credits), TZ1 is working with project developers, governments, non-profits, corporates and the financial services sector to help shape and facilitate transparent and robust environmental markets. The TZ1 Registry is registry provider for the Voluntary Carbon Standard, the Social Carbon Standard, the Climate Community and Biodiversity standard, Plan Vivo, Carbon Fix, the American Carbon Registry and others.

J.P. Morgan / Climate Care (www.jpmorgan.com, www.jpmorganclimatecare.com). An award-winning provider in environmental markets, J.P. Morgan is the only bank to offer clients a full end-to-end solution across origination, sales, trading and risk management on a global basis, in both compliance and voluntary carbon markets. From the launch of the first Gold Standard efficient cook-stove project to initiatives to convert waste sugar cane into clean renewable power, the bank's Environmental Markets team is actively involved through every stage of the carbon lifecycle – from carbon asset development through trading and risk management to full service client offerings in the voluntary offset market through ClimateCare. A part of J.P. Morgan's Environmental Markets group, ClimateCare is a leading carbon offset provider with over ten years of experience in sourcing, originating and retailing carbon offsets in voluntary and compliance markets. ClimateCare works directly on the ground with partners to originate projects in low carbon technologies. The group specializes in community based projects including efficient stoves and treadle pumps and renewable energy from wind and small hydro.

Sponsors

Baker & McKenzie (www.bakernet.com) has been at the forefront of the development of global carbon markets and climate law and policy for more than a decade,. With particular strength in the developing countries of Latin America and Asia as well as established markets in Europe and the US, we have represented and continue to advise the market makers on market-leading deals. Trusted for our expertise and valued for our experience, we regularly work on transactions with our clients that are first-to-market, including being among the first to draft carbon contracts and serving as lead counsel on the largest public and private carbon transactions the market has seen.

Essent Trading (www.essenttrading.com) headquartered in Geneva, Switzerland, is an asset-backed merchant energy trading business with its roots in the Netherlands. Essent Trading is recognised as a market leader in energy trading in Europe and has been consistently voted a top-tier trading house by Energy Risk Magazine since 2004. Our parent company, Essent N.V. is the largest energy company in the Netherlands with approximately 11,000 employees, more than 5500 MW of diverse generation portfolio and over 2.6 million customers across the Netherlands, Belgium and Germany. Essent is ranked among Europe's leading companies in renewable and sustainable energy generation.

GE / AES Greenhouse Gas Services (www.ghgs.com), LLC is a venture of GE Energy Financial Services and the AES Corporation. The business invests in and develops projects that reduce greenhouse gas emissions and sells independently verified credits to organizations that want to meet internal emissions reduction targets or to offset greenhouse gases from products and services. Each credit is verified by an independent third party and certified by Greenhouse Gas Services to a rigorous Standard.

MF Global (www.mfglobal.com) is a leading independent broker of exchange-listed and OTC-traded energy futures and options, MF Global provides unparalleled access to the world's energy markets. Whether on an exchange or over the counter, floor based or electronic, our focus is delivering superior order execution and clearing and trade execution services. With a reputation for excellent client service, MF Global's market coverage and local insight enable us to expertly originate and match bespoke trades to provide our clients with access to U.S. and international voluntary carbon credits.

Karbone (www.karbone.com) is a leading environmental finance, credit brokerage, and carbon advisory firm. Karbone was founded on the principle of helping clients exceed their business objectives in the environmental marketplace. The Karbone team, with offices in New York and London, is composed of a unique combination of professionals with experience in environmental finance, credit trading, business strategy, sustainability and regulatory affairs. The breadth and depth of the team's backgrounds allows Karbone to provide innovative yet efficient deal structures and solutions in a variety of environmental markets and financing sectors.

TÜV SÜD (www.tuev-sued.com) is an internationally leading technical service organization with over 13.000 employees and present at more than 600 locations worldwide. Under the UNFCCC, TÜV SÜD is the only Designated Operational Entity (DOE) accredited for all scopes of the CDM. Having accompanied over 1000 projects through validation and verification, TÜV SÜD was elected „best verifier of Kyoto projects" by the magazine „Environmental Finance". Beside its market leadership in JI and CDM, TÜV SÜD is one of the key verifiers in the Voluntary Carbon Market. Having developed the robust standard VER+ and providing the BlueRegistry for VERs, TÜV SÜD demonstrates its commitment to transparency and credibility of voluntary emission reductions.

Appendix: Carbon Offset Supplier List*

3Degrees	http://www.3degreesinc.com
AgRefresh	http://www.agrefresh.org
AMBIO	http://www.ambio.org.mx
Atrium Carbon Fund LP	http://www.atriumbrokerage.com
AusCarbon Pty Ltd	http://www.auscarbongroup.com.au
Australian Carbon Traders	http://www.australiancarbontraders.com
BalanceCarbon	http://www.balancecarbon.com
Blue Source LLC	http://www.bluesource.com
Bonneville Environmental Foundation	http://www.b-e-f.org
Brighter Planet	http://www.brighterplanet.com
Camco International	http://www.camcoglobal.com
CantorCO2e	http://www.cantor.com
Carbon Balance Consulting	http://www.carbonbalanceconsulting.com.au
Carbon Clear Limited	http://www.carbon-clear.com
Carbon Conservation	http://www.carbonconservation.com
Carbon Life Ltd	http://www.carbonlifeltd.com
Carbon Reduction Fund	http://www.carbonreductionfund.org
Carbonfund.org	http://www.carbonfund.org
Carbonza P/L	http://www.carbonza.com
Clean Air Action Corp	http://www.CleanAirAction.com
Clear, the carbon offset company	http://www.clear-offset.com
ClearSky Climate Solutions	http://www.clearskyclimatesolutions.com
CLIMACT	http://www.climact.com
CLIMAT MUNDI	http://www.climatmundi.fr
Climate Friendly	http://www.climatefriendly.com
Climate Neutral Group	http://www.climateneutralgroup.com
CO2logic	http://www.co2logic.com
CO2OL – Forest Finance Group	http://www.co2ol.de
co2operate BV	http://www.tiscali.nl
Colorado Carbon Fund	http://www.coloradocarbonfund.org
Commerce Carbon Exchange	http://www.commercecarbon.com
Community Energy, Inc.	http://www.newwindenergy.com
Conservation International	http://www.conservation.org
Cool Planet	http://www.coolplanet.com.au
CoolClimate LLC	http://www.atmosclear.org
COzero	http://www.cozero.com.au
CP Holdings LLC	http://www.carbonlesspromise.com
CPS Carbon Project Solutions Inc.	http://www.carbonprojectsolutions.com
Delta Institute	http://www.delta-institute.org
Demirer Enerji	http://www.demirerholding.com

Ducks Unlimited Inc	http://www.ducks.org
E.Value - Estudos e Projectos de Ambiente e Economia, S.A.	http://www.evalue.pt
E+Co	http://www.eandco.net
EcoLogic Development Fund	http://www.ecologic.org
EcoSecurities	http://www.ecosecurities.com
ecosur	http://www.ecosur.fr
Emergent Ventures Pvt Ltd	http://www.emergent-ventures.com
Enecore Carbon Limited	http://www.enecore.com
Energy Mad Limited	http://www.energymad.co.nz
Environmental Capital LLC	http://www.encapllc.com
Environmental Credit Corp.	http://www.envcc.com
ERA Ecosystem Restoration Associates Inc.	http://www.econeutral.com
Essent Trading International S.A.	http://www.essenttrading.com
Evolution Markets	http://www.evomarkets.com
First Climate	http://www.firstclimate.com
Forests NSW	http://www.sf.nsw.gov.au
Global Green Energy LLC	http://www.globalgreen-energy.com
global woods AG	http://www.global-woods.com
GoodPlanet /Action Carbone	http://www.actioncarbone.org
Green Carbon Limited	http://www.greencarbon.co.nz
Green Mountain Energy	http://www.greenmountain.com
Greenhouse Balanced	http://www.greenhousebalanced.com.au
Greenhouse Gas Services	http://www.ghgs.com
Grupo Ecológico Sierra Gorda	http://www.prodigy.net.mx
Habitat Enterprises Ltd.	http://www.habitatenterprises.ca
J.P. Morgan Ventures Energy Corp.	http://www.jpmorganclimatecare.com
JJCENG.COM, PC	http://www.jjceng.com
LiveCooler Foundation, Inc.	http://www.livecooler.org
LMS Generation Pty Ltd	http://www.lms.com.au
Low Energy Supplies and Services Pty Ltd	http://www.lowenergy.com.au
Meridian Energy	http://www.meridianenergy.co.nz
MF Global	http://www.mfglobalenergy.com
myclimate Foundation	http://www.myclimate.org
NativeEnergy, Inc	http://www.nativeenergy.com
North Coast Forest Conservation Programme	http://conservationfund.org
Offsetters	http://www.offsetters.ca
Origin Energy	http://www.originenergy.com.au
Pacific Forest Trust	http://www.pacificforest.org
Paso Pacífico	http://www.pasopacifico.org
Prime Carbon Pty Ltd	http://www.primecarbon.com.au
SKG SANGHA	http://www.skgsangha.org/

South Pole Carbon Asset Management	http://www.southpolecarbon.com
Southern Metropolitan Regional Council	http://www.smrc.com.au
Standard Carbon LLC	http://www.standardcarbon.com
Sterling Planet, Inc.	http://www.sterlingplanet.com
Terra Commodities Limitada	http://www.terrabro.com
TerraPass Inc.	http://www.terrapass.com
TFS Green	http://www.tfsgreen.com
The CarbonNeutral Company	http://www.carbonneutral.com
The Climate Trust	http://www.climatetrust.org
The Conservation Fund GoZero	http://www.conservationfund.org
The Nature Conservancy	http://www.tnc.org
The PACE Centre	http://www.carbon.org.za
The Trust for Public Land	http://www.tpl.org
The Woodland Trust	http://www.woodlandtrust.org.uk
Trees for Travel	http://www.treesfortravel.nl
Trees, Water & People	http://www.treeswaterpeople.org
Tricorona	http://www.tricorona.se
Tullett Prebon	http://www.tullettprebon.com
Village Green Energy	http://www.villagegreenenergy.com
VOLTALIA	http://www.voltalia.com
World Land Trust	http://www.worldlandtrust.org
Zero Emissions Technologies, S.A.	http://www.zeroemissions.abengoa.com
Zerofootprint	http://www.zerofootprint.net
ZeroGHG Inc.	http://www.zeroghg.com

**Note: This table features only those suppliers who shared volume data for our 2009 survey and elected to be listed.*

Appendix: OTC Transaction Volumes by Source Region and Project Type

Transaction Volumes and Values, Global Carbon Market, 2007 and 2008

$ktCO_2e$	EU	Non-EU	Canada	US	AU/NZ	Latin Am.	Asia	Middle East	Africa	Not Specified	Total	% of Total
Forestry/Land Use	**99**	**1**	**231**	**2,067**	**66**	**804**	**1,845**		**539**		**5,652**	**11.1%**
Aff/Ref plantation	15		231	8	29	349			60		632	1.2%
Aff/Ref conservation	84			1,201	12	257	1,845				339	6.7%
Avoided deforestation				40	14	197			479		54	0.1%
Forest Management				431							431	0.8%
Other Land Based				130							130	0.3%
Ag Soil				256	10	1					266	0.5%
Methane	**118**		**260**	**8,755**	**802**	**28**	**579**	**48**	**3**	**1**	**10,594**	**20.8%**
Livestock	35			1,158		27	8	48	3		1,279	2.5%
Landfill			260	7,460	790	1	85			1	8,597	16.9%
Coal Mine	83			136	12		486				717	1.4%
Renewable Energy			**7**	**352**	**339**	**753**	**17,035**	**7,313**	**0**	**2**	**25,801**	**50.7%**
Wind			5	187	338		2,218	4,813			7,692	15.5%
Hydro				2		294	13,634	2,500			16,436	31.7%
Solar				1	1	5	8				14	0.03%
Biomass				26		454	1,176			2	1,644	3.3%
RECs				135							135	0.3%
Energy Efficiency				**55**	**326**	**285**	**1,278**	**125**	**3**	**43**	**2,115**	**4.2%**
Fuel Switching			**17**	**4**		**141**	**375**				**537**	**1.1%**
Geo Sequestration				**2,647**							**2,647**	**5.2%**
Fugitive Emissions					**301**		**770**				**1,071**	**2.1%**
Industrial Gas				**282**		**4**	**1**				**287**	**0.6%**
Other/ Not Specified				**319**	**49**	**101**	**829**		**35**	**802**	**2,135**	**4.2%**
Total	**217**	**1**	**515**	**14,480**	**1,884**	**2,116**	**22,712**	**7,486**	**579**	**847**	**50,837**	
Percent of Total	**0.4%**	**0%**	**1%**	**28.5%**	**3.7%**	**4.2%**	**44.7%**	**14.7%**	**1.1%**	**1.7%**		

Source: Ecosystem Marketplace, New Carbon Finance.

Note: the numbers only represent those transactions that were recorded in our matrix survey questions, which indicates both type and region. It is therefore less than the 54 Mt tracked in the OTC market as for some volumes we did not have this degree of disaggregation.