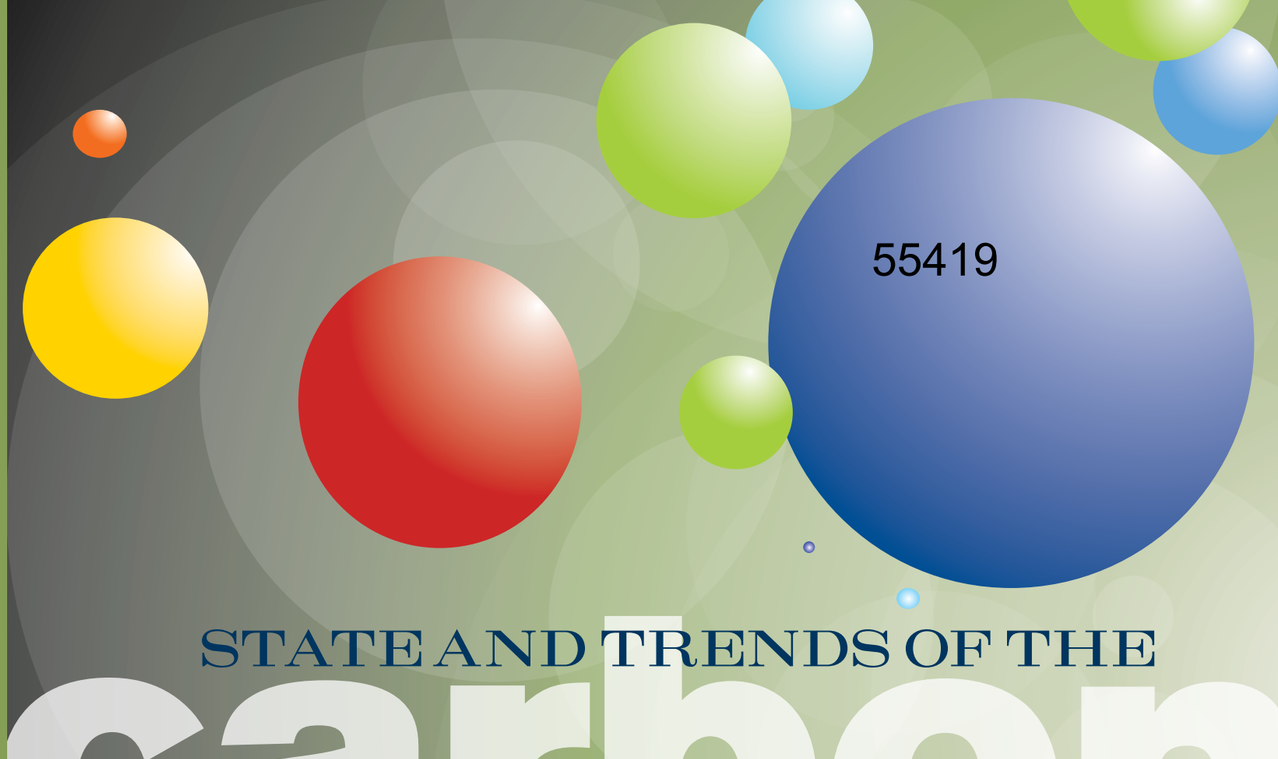
www.carbonfinance.org

THE WORLD BANK
1818 H STREET, NW
WASHINGTON, DC 20433 USA

STATE AND TRENDS OF THE carbon market 2010



STATE AND TRENDS OF THE carbon market 2010

WASHINGTON, DC . MAY 2010

STATE AND TRENDS OF THE
CARBON MARKET
2010

Alexandre **Kossoy**
Senior Financial Specialist
Carbon Finance Unit

Philippe **Ambrosi**
Environmental Economist
Climate Change Team

Environment Department

All photo credits: Shutterstock Images LLC, except page 4 by (c) George Hammerstein/Corbis
Cover design: Patricia Hord Graphik Design
Layout and typesetting: The Word Express, Inc.
Printing: Westland Printers

ACKNOWLEDGMENTS

We, the authors, would like to acknowledge our editor, Andy Stone, whose countless insightful contributions ensured the quality and clarity of this report.

We are also grateful to our many colleagues in the carbon market who provided their written contributions and perspectives: Imtiaz Ahmad, Claudia Barrera, Benoit Bosquet, Rodney Boyd, Lance Coogan, Lex de Jonge, John Kilani, Werner Kornexl, Aditi Maheshwari, Taisei Matsuki, Grzegorz Peszko, Alexandrina Platonova-Oquab, Monali Ranade, Milo Sjardin, and Jari Vayrynen.

Finally, we also wish to extend our thanks to those who offered their cooperation and insights during the elaboration of this report: Luz Abusaid, Agnes Biscaglia, Veronique Bishop, Eron Bloomgarden, Anna-Maria Bogdanova, Martina Bosi, Jean-Christophe Bougle, Alban Brindle, John Buckman, Scott Cantor, James Cantrell, Marcos Castro, Dougal Corden, Isabelle Curien, Karen Degouve de Nuncques, Eduardo Dopazo, Nadine Dulac, Patricia Ephraim, Emmanuel Fages, Justin Felt, Francisco Fernandez Asin, Sonia Medina Gomez, Pierre Guigon, Isabel Hagbrink, Takashi Hongo, Lenny Hochschild, Pedro Huarte-Mendicoa, Robert Hunt, Carollyne Hutter, Masaya Inamuro, Friso de Jong, Yvan Keckeis, Ted Kennedy, Solvita Klapare, Daigo Koga, Anita L. Kossoy, Benoit Leguet, Martin Lawless, Mark Lewis, Gautier Le Maux, Vincent Monteux, Lucy Mortimer, Ken Newcombe, Shahyar Niakan, Akiko Nishimae, John O'Brien, Ian O'Donohue, Roon Osman, Christian de Perthuis, Neeraj Prasad, Saima Qadir, Brice Quesnel, David Rapin, Frank Rasmussen, Pontus Ripstrand, Fabrice Le Sache, Geoff Sinclair, Chandra Shekhar Sinha, Laurent Segalen, Ash Sharma, Trevor Sikorski, Sara Stahl, Barry Sterland, Charlotte Streck, Endre Tvinnereim, Laurent Valiergue, Jan-Willem van de Ven, Ariane Verbeeck, Alessandro Vitelli, Emilio Weldon, Yevgen Yesyrkenov, Bernhard Zander, Elizabeth Zelljadt, and Susann Zimmer.

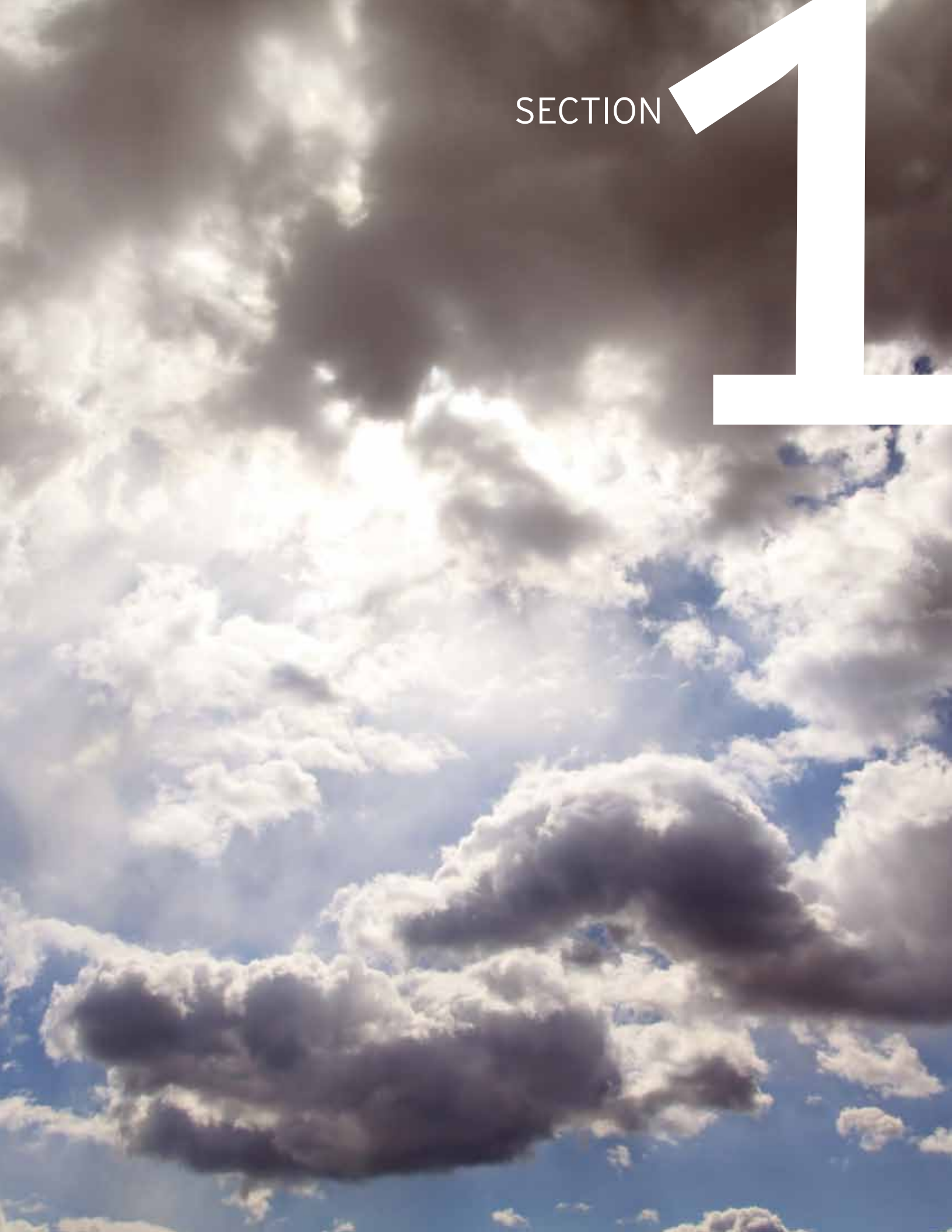
State and Trends of the Carbon Market 2010 received financial support from the CF-Assist Program, managed by the World Bank Institute (WBI), as well as from the Carbon Finance Unit of the World Bank.

LIST OF ACRONYMS AND ABBREVIATIONS

AAU	Assigned Amount Unit
AAUPA	AAU Purchase Agreement
ACR	American Carbon Registry
AWG-KP	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
AWG-LCA	Ad Hoc Working Group on Long-term Collaborative Action
CAPEX	Capital Expenditure
CAR	Climate Action Reserve
CCS	Carbon Capture and Storage
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFL	Compact Fluorescent Lamp
CH_4	Methane
CMM	Coal Mine Methane
CMP	Conference of the Parties serving as the Meeting of the Parties
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COP	Conference of the Parties
CPA	CDM Programme Activities
CPRS	Carbon Pollution Reduction Scheme
CP1	First Commitment Period under the Kyoto Protocol
CRT	Climate Reserve Tonne
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EC	European Commission
ECX	European Climate Exchange
EE	Energy Efficiency
ESS	Energy Savings Scheme
EIT	Economy in Transition
EITE	Emission-intensive, Trade-exposed
ER	Emission Reduction
ERPA	Emission Reduction Purchase Agreement
ERU	Emission Reduction Unit
ESC	Energy Savings Certificate
ETS	Emissions Trading Scheme
EU	European Union
EUA	European Union Allowance
EU ETS	European Union Emissions Trading Scheme
EURIBOR	Euro Interbank Offered Rate
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Green Investment Scheme
HFC	Hydrochlorofluorocarbon
IEA	International Energy Agency
IMF	International Monetary Fund
IRR	Internal Rate of Return
J-VETS	Japan-Voluntary Emissions Trading Scheme
JI	Joint Implementation
JISC	Joint Implementation Supervisory Committee
KM	Kyoto Mechanism
LDC	Least Developed Country
lCER	Long-term Certified Emission Reduction
LFG	Landfill Gas
LoA	Letter of Approval
LULUCF	Land Use, Land Use Change and Forestry
MOP	Meeting of the Parties
MRET	Mandatory Renewable Energy Target
MRV	Monitoring, Reporting, and Verification
N_2O	Nitrous Oxide
NAP	National Allocation Plan
NPV	Net Present Value
NSW GGAS	New South Wales Greenhouse Gas Reduction Scheme
NZ ETS	New Zealand Emissions Trading Scheme
NZU	New Zealand Unit
OECD	Organisation for Economic Co-operation and Development
OTC	Over-the-Counter

pCER	Primary Certified Emission Reduction
PDD	Project Design Document
PFC	Perfluorocarbon
PIN	Project Idea Note
PoA	Programme of Activities
PP	Project Participant
RE	Renewable Energy
REC	Renewable Energy Certificate
REDD	Reduced Emissions from Deforestation and Forest Degradation
RET	Renewable Energy Target
RGGI	Regional Greenhouse Gas Initiative
RMU	Removal Unit
sCER	Secondary Certified Emission Reduction
SF_6	Sulfur hexafluoride
SME	Small and Medium-size Enterprise
tCO_2e	Ton of Carbon Dioxide Equivalent
tCER	Temporary Certified Emission Reduction
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value-added Tax
VCS	Voluntary Carbon Standard
VER	Verified Emission Reduction
WB	World Bank
WTI	West Texas Intermediate

TABLE OF CONTENTS


SECTION
1

EXECUTIVE SUMMARY

The carbon market endured its most challenging year to date in 2009. The global economic crisis, which started in late 2008 and intensified early in 2009, negatively impacted both the demand and supply sides of the market. As industrial output plummeted the demand for carbon assets fell. On the supply side the financial crisis spurred financial institutions and private investors to deleverage and redirect their positions away from risky investments and toward safer assets and markets. Capital inflow to developing countries fell dramatically, while already internalized resources flowed out. As a result, many project developers found it impossible to lock in finance and project origination effectively ground to a halt.

	2008		2009	
	Volume ($MtCO_2e$)	**Value** (US$ million)	**Volume** ($MtCO_2e$)	**Value** (US$ million)
Allowances Markets				
EU ETS	3,093	100,526	6,326	118,474
NSW	31	183	34	117
CCX	69	309	41	50
RGGI	62	198	805	2,179
AAUs	23	276	155	2,003
Subtotal	3,278	101,492	7,362	122,822
Spot & Secondary Kyoto offsets				
Subtotal	1,072	26,277	1,055	17,543
Project-based Transactions				
Primary CDM	404	6,511	211	2,678
JI	25	367	26	354
Voluntary market	57	419	46	338
Subtotal	486	7,297	283	3,370
Total	**4,836**	**135,066**	**8,700**	**143,735**

Subtotals and totals may not exactly add up because of rounding.

TABLE 1
Carbon market at a glance, volumes and values, 2008–09

Sources: World Bank, and Bloomberg New Energy Finance and Ecosystem Marketplace for data on the voluntary market

Yet even as global GDP declined by 0.6% in 2009, and at a more perilous rate of 3.2% in industrialized economies,[1] the carbon market demonstrated resilience. The total value of the market grew 6% to US$144 billion (€103 billion) by year's end with 8.7 billion tCO_2e traded (see Table 1).

[1] International Monetary Fund, 2010, *World Economic Outlook* (April).

BOX **Residual demand for Kyoto assets through 2012 will total 230 $MtCO_2e$**

Analysts have continuously revised downward their CER issuance projections and now forecast a total of just **one billion tCO_2e** by 2012. Although an increasing number of JI projects have begun to deliver assets, slightly less than **200 million** Emission Reduction Units (ERUs) will be available for compliance buyers prior to 2013. Potential AAU supply has risen to **1.8 billion tCO_2e** thanks to the significant progress several countries have made in implementing Green Investment Schemes (GIS).

As emissions projections have also been revised downward, expected gross demand for Kyoto assets from governments of industrialized Annex B countries through 2012 has fallen to **475 $MtCO_2e$**. EU-15 remains the chief source of demand with more than 70% of volume or about **350 $MtCO_2e$**. Japan is now believed to be well on track to comply with its Kyoto commitment and gross demand from the government remains on the level of **100 $MtCO_2e$**.

Gross demand from private entities is estimated at **750 $MtCO_2e$**. The projected CDM and JI demand from European entities over Phase II of the EU ETS is about **540 $MtCO_2e$**. Private sector companies in Japan were among the hardest hit by the global economic downturn and the corresponding fall in industrial output. Their demand should not total more than **200 $MtCO_2e$**.

Taking into account what was contracted through 2009, the estimated residual (net) demand for Kyoto assets over the next three years is **230 $MtCO_2e$**, virtually all of which is attributable to European governments.

The European Union Emissions Trading Scheme (EU ETS) remained the engine of the carbon market. A total of US$119 billion (€89 billion) worth of allowances and derivatives changed hands. Futures trades continued to account for the bulk of transactions with a 73% share, while spot market volume swelled to 1.4 billion tons as cash-strapped EU companies monetized allowances to raise funds in a tight credit environment. Sophistication also increased in the options market, which grew 70% to 420 million tons. However, trading volume in the secondary market for Kyoto offsets leveled off at one billion tons and value fell by one third to US$18 billion (€13 billion) as prices declined.

Market consolidation accelerated in 2009 as financial players that had weathered the economic storm chose to acquire undervalued portfolios rather than engage in project origination. Other players exited the market or significantly reduced their activity and, as a result, project-based transactions declined by 54%.

China remained the largest Clean Development Mechanism (CDM) seller, although Africa and Central Asia, historically overlooked regions, increased their share as buyers sought diversification. CDM contracted severely, by 59%, to US$2.7 billion (€1.9 billion). The Joint Implementation (JI) market fared no better. Finally, the number of Assigned Amount Unit (AAU) deals increased as the health of the offset market declined, with the Czech Republic and Ukraine as the major sellers.

Structural issues hobbled the CDM market as well. The complexity and changing nature of regulations, inefficiencies in the regulatory chain and capacity bottlenecks caused delays and negatively impacted project finance. As a result, it now takes over three years for the average CDM project to make its way through the regulatory process and issue its first Certified Emission Reductions (CERs).

Yet the same problems that have hindered the project-based market may ultimately be the silver lining that sets the stage for a stronger post-2012 market. EU installations will have used fewer CERs and ERUs than allowed under their import limit during Phase II of the ETS, thus, theoretically, sustaining future demand. Under this scenario sound upcoming projects and programs, mainly in emerging regions and sectors, should have greater opportunity to sell their assets. Increased competition for eligible primary CERs should also prevent their prices from falling in coming years.

Nonetheless, clear policy and regulatory signals must be urgently provided if a stronger global market is to emerge. As things stand, the Copenhagen climate conference's inconclusive outcome has deepened the sense of uncertainty over the future of the global emission reductions effort and the likelihood that international policymakers will be able to reach a legally binding agreement next December in Cancún.

In the United States, the Regional Greenhouse Gas Initiative (RGGI) grew almost 10-fold to US$2.2 billion (€1.6 billion) in expectation of federal carbon regulation; it now appears unlikely that such regulation will emerge anytime soon. To make matters worse, Australia's effort to develop a national scheme has stalled. These challenges, combined with more limiting import rules under Phase III of the EU ETS, threaten to erode the long-term interest of major actors in carbon finance despite the strong support of developing countries for the Kyoto mechanisms.

New Zealand provided a glimmer of hope in 2009 when it became the first country outside of Europe to adopt a mandatory, economy-wide ETS. In addition, new initiatives in developing and developed countries have emerged that explore innovative market approaches to climate finance. Still, considerable effort, ingenuity, and capacity will be required for carbon finance mechanisms, along with other policy and finance instruments, to address the immense scale of the climate challenge.


SECTION
2

EU ETS

2.1 AT A GLANCE **The total value of European Union Allowance (EUA) transactions in 2009 rose 18% to US$118.5 billion (€88.7 billion), due to a robust 105% increase in trading volume over 2008. The growth in overall transaction value occurred despite the fact that average EUA prices fell 42% to US$18.7 (€14.0), versus US$32.5 (€22.1) the year before.**

The second year of Phase II of the EU Emissions Trading Scheme (EU ETS) started with a crash in EUA prices, continuing the decline that had begun in the second half of 2008 as the financial crisis widened and stoking fear among market participants of a repeat of the end of Phase I. Prices fell to record lows during the first quarter as EU companies found themselves long on EUAs and sold heavily, mainly on the spot market, to generate cash and shore up their balance sheets. By February 2009 EUA prices had plummeted to €8, versus €30 nine months earlier (see Figure 1).

By May, however, after what seemed an eternity for players that had endured the worst of the crisis, the market began a quick rebound and allowance prices stabilized within a narrow range of €13 to €16 for the remainder of 2009.

The financial turmoil led to substantial changes in the market. Financial institutions that had been active players, such as Lehman Brothers and Bear Stearns, had collapsed. Other important banks significantly reduced their activities in the carbon space while few new companies dared to enter the market during the downturn.

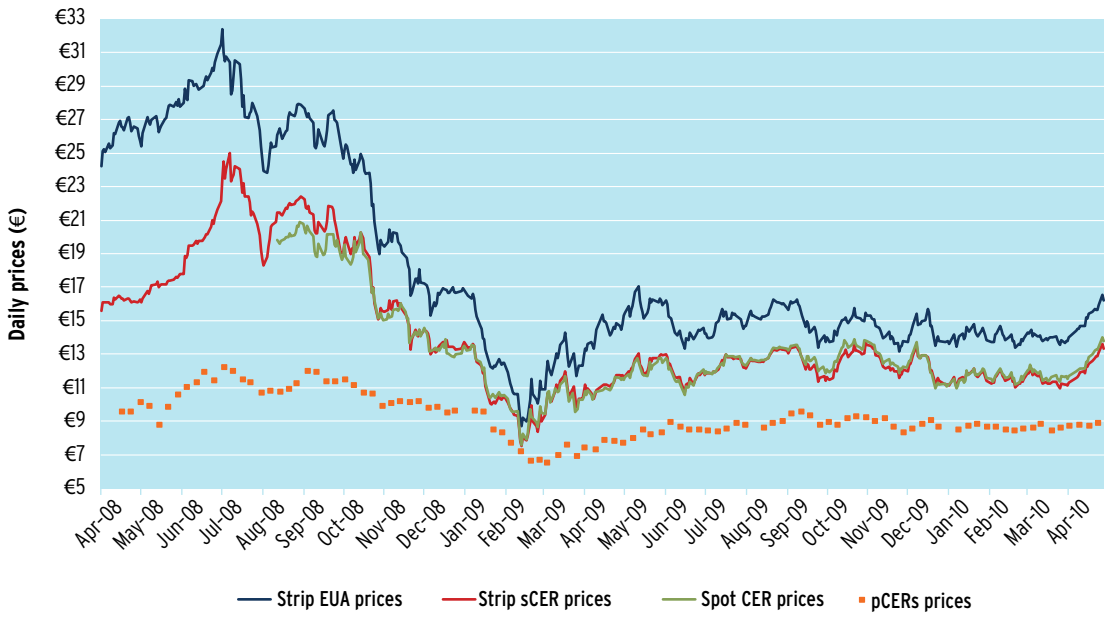


FIGURE 1
Carbon prices, 2008–09

Source: ECX, BlueNext, IDEAcarbon, and World Bank

The EU ETS was also marked by controversy during 2009. The European Court of First Instance annulled the European Commission (EC) decision to withhold EUAs from the National Allocation Plans (NAPs) of Poland and Estonia, evidence surfaced of "carousel" Value-added Tax (VAT) fraud in countries like France and the United Kingdom and a phishing attempt was made on Germany's national EUA registry (see Box 1 and Box 3 for details). More recently, the "recycling" of surrendered CERs added to the challenges faced by the European ETS (see Box 4 for details).

Ironically, however, these controversies provide evidence that the emissions market is maturing and becoming mainstreamed within the European economy. Entities don't seek out loopholes in insignificant markets, fraudsters do not focus on small businesses, and disputes over NAPs demonstrate that carbon has become very important to the involved countries. Through these challenges the EU ETS has demonstrated resilience and the capacity for swift self-adjustment.

As a market mechanism, the EU ETS should be evaluated according to how accurately it has reflected macro-economic trends. The fact that carbon prices fell along with the prices of mature energy commodities as the global economic crisis deepened, and rebounded amidst signs of recovery, suggests the market is both efficient and rational. The price of carbon reflected expectations for the amount of abatement required to limit emissions under a changed economic scenario.

Finally, last year U.S. funds and trading companies participated substantially in the EU ETS for the first time. Evidence strongly indicates that U.S. players represented 10–15% of trade volume on London's European Climate Exchange (ECX), primarily through a small number of trades of large EUA lots. Japanese players were also active although in lower proportion. Private sector participation from both countries may have been motivated by the expectation of future obligations under federal schemes as well as short-term profit making.

2.2 SUCCESSES OF THE EU ETS[2]

The successes of the European ETS are both measurable and diverse, and lessons learned during the scheme's first five years will help guide its expansion as well as the likely development of new greenhouse gas reduction programs around the globe.

(i) The scheme has thus far succeeded in its main goal of reducing overall carbon emissions. Available data point to a 2–5% decline in emissions (40–100 $MtCO_2e$ annually) attributable to the ETS during the trial period of 2005–07.[3] The decline was probably considerably larger in 2008, when allowance prices increased vis-à-vis 2007.[4] The fact that companies have achieved true emission reductions regardless of trade volumes and in the presence of sophisticated financial instruments is critical to the political viability of the EU ETS.

(ii) As a result of the ETS, European power companies have begun to fully integrate the cost of carbon into their investment decisions and include more low-carbon technologies, such as combined cycle gas turbines, high-efficiency coal and renewable energy (e.g., wind) in their future plant mix.[5]

[2] This section has benefitted from thoughtful contributions and publications of CDC Climat, Barclays Capital, and Deutsche Bank.

[3] The electric utility sector accounted for the bulk of emission reductions through increased use of clean generation technologies. Utilities brought online lower emitting, more efficient coal plants while replacing some coal generation with cleaner natural gas. Anecdotal data also suggest improvements in energy efficiency.

[4] A. D. Ellerman, F. J. Convery, C. de Perthuis, 2010, *Pricing Carbon: The European Union Emissions Trading Scheme*, Cambridge University Press.

[5] Research shows that carbon prices are encouraging European power companies to build cleaner power stations. Source: New Energy Finance, 2009, *Impact of the EU ETS on power sector investments—a survey of European utilities*.

(iii) The ETS provides assurance to utilities that there will be a long-term carbon price, helping drive the shift to lower CO_2 emitting technologies.

(iv) Europe's ETS has promoted the development of low-carbon projects worldwide by creating a framework that allows the utilization of assets generated through the Clean Development Mechanism (CDM) and Joint Implementation (JI) for compliance purposes within the ETS.[6]

(v) The ETS has created a cost-effective, scalable infrastructure of registries, accounting methods, and monitoring, reporting and verification systems that will be ready to serve the ambitious emissions schemes of the future.

(vi) These successes show that a multi-national emissions trading scheme can exist despite significant differences among participating nations, and provide a viable model for a potential global trading regime for the reduction of GHG emissions.

"These successes show that a multi-national emissions trading scheme can exist despite significant differences among participating nations, and provide a viable model for a potential global trading regime for the reduction of GHG emissions."

Nevertheless, concerns about the EU ETS have been raised by market players, observers and skeptics. We discuss some of the highest-profile issues below:

(i) There has been concern that the high price volatility of carbon assets will discourage investment in low-carbon/emission reduction projects. While the price volatility in the pilot phase reflected, in part, the inability to carry over unused allowances into the subsequent period (banking is already allowed for Phase II onwards), the price volatility in Phase II has correctly reflected macro-economic fundamentals. Prices in Phase II reflected the demand for carbon assets as determined by the level of the emissions cap and the actual level of emissions. When emissions fell due to the worst recession in a generation, carbon prices fell in tandem. It must be remembered that the EU ETS, as any cap-and-trade scheme, limits the quantity of emissions (with the market then establishing a price that is consistent with that level of scarcity). It does not guarantee a fixed price (if a fixed price is targeted, a tax scheme is more appropriate). While progressive migration from free allocations to auctioning should strengthen price signals and further reduce EUA volatility, prices will continue to reflect reasonable expectations of supply and demand over the short and long terms.

(ii) While some have questioned whether the EU ETS has been worthwhile given windfall profits, the more important question concerns how allowance value created by the carbon cap has been spent. If European governments had auctioned EUAs the question of proper use of funds would be directed towards those governments rather than towards businesses. The fact that emissions have declined under the ETS more than would have otherwise occurred indicates that at least some portion of the proceeds has indeed been constructively invested.

In addition, it is unlikely that the EU ETS would have come into being without free allocation, which owners of affected installations view as compensation for abatement costs.

(iii) Concern has arisen that European industrial companies could choose to relocate their operations outside the ETS rather than reduce emissions, thereby causing leakage in the

[6] It is expected that, should the supply side permit (i.e., the offsets will be created), the entire import cap for offsets defined under the EU Revised Directive (about 1,700 $GtCO_2e$) will be used by the ETS installations by 2020.

scheme. However, a study[7] that examined import and export data for goods whose production now incurs a carbon cost (i.e., cement and steel) found no leakage. By and large, net import trends prior to 2005 continued unchanged during 2005–07. This is not surprising since the cost of carbon has been just one of many costs that determine industrial production and location; the carbon price alone has not been a determining factor.

(iv) Some support governmental intervention in the cap and trade market to maintain the price of carbon assets at a level sufficient to incentivize industry to reduce emissions. EU ETS essentially rations the use of atmospheric storage of Greenhouse Gases (GHGs) through property rights and a price mechanism. It relies upon uninhibited market forces to enable efficient pricing of assets. Thus, external interventions would be counterproductive because they would increase uncertainty rather than reduce it. However, for the very limited and specific purpose of prudently reducing market volatility a formulaic intervention that is not arbitrary and unpredictable, and can be anticipated by the market, could be considered.

2.3 EUAS: GROWING VOLUMES, CHANGING PATTERNS

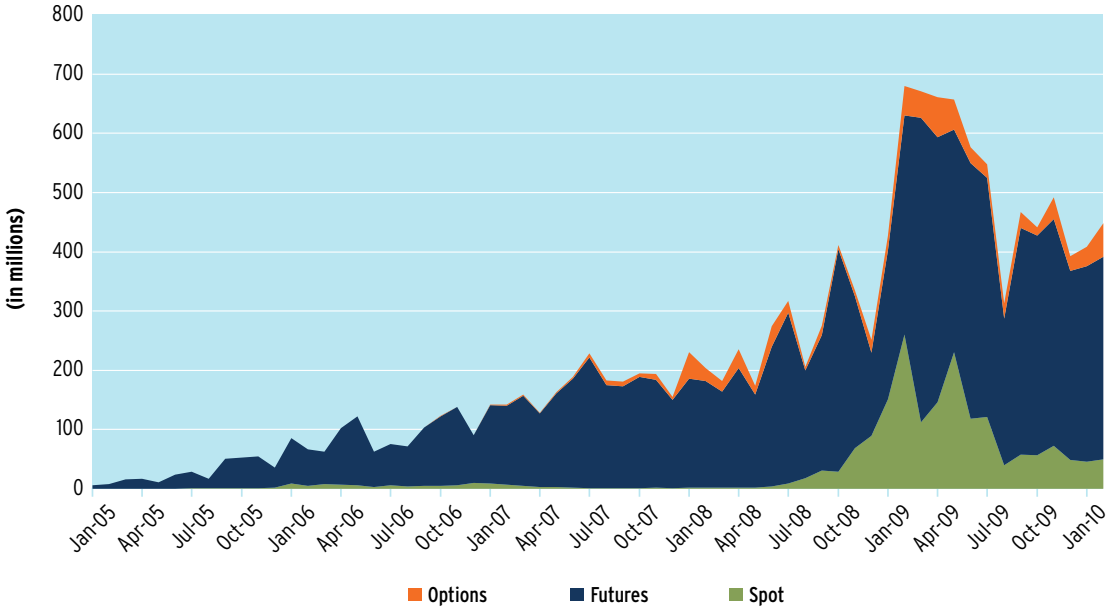
2.3.1 EUA resiliency faces its greatest test since the inception of the ETS

EUA transactions in 2009 reached US$118.5 billion (€88.7 billion), making the EU ETS the largest existing carbon market. Over 6.3 billion tCO_2e changed hands in 2009 through spot, futures and options contracts. A substantial portion of the growth came from the spot market, which totaled 1.4 billion tons, an increase of 450% over 2008. Over 70% of spot transactions occurred during the first half of the year, when cash-strapped EU companies monetized allowances to raise funds in the midst of a tight credit environment (please refer to Section 2.3.1.3). Spot volumes in the first half of 2009 increased 75-fold over the year-earlier period (see Figure 2).

In addition to the industry sell-off of allowances, many trading and financial companies took the opportunity to gain free, temporary funds via the VAT levied across the EU on spot transactions, which contributed substantially to the growth of spot volume. A VAT-evasion scheme known as "carousel" VAT-fraud also emerged. Evidence of

FIGURE 2
Monthly volumes for each contract modality since 2005

Source: World Bank



[7] A. D. Ellerman, F. J. Convery, C. de Perthuis, 2010, *op. cit.*

VAT fraud led the Paris-based carbon exchange BlueNext to temporarily halt trading during the second quarter while tax authorities launched a series of measures to combat the problem (for further details, refer to Box 1).

In 2009 market players sought greater contractual transparency as the business environment became increasingly risky and concern grew over the rising potential for defaults of futures contracts. As a result the number of Over-the-Counter (OTC) bilateral contracts cleared on the European exchanges increased compared to 2008[8] (see Figure 3).

As the worst of the economic storm passed, however, it became clear that economic recovery would move slowly in the EU. In response, the number of spot contracts fell in the second half of 2009. Spot volumes have since stabilized and during the first months of 2010 they accounted for 10–15% of total EUA volume.

Although robust and resilient, recent challenges[9] indicate that there is still room for improvement in terms of system linkage and infrastructure in the EU ETS.

A recent, extensive report commissioned by the French Government assesses regulatory issues in the carbon market. This is timely, as the EC intends to finalize its carbon market regulation before the EU ETS enters Phase III. The report calls for a harmonized regulatory framework and market surveillance system, including: (i) a unified legal, accounting and taxation framework across the EU; (ii) stricter access to registry accounts to avoid fraud and market abuse; (iii) greater transparency on market fundamentals; (iv) sanctions to discourage and punish market abuse; (v) a market surveillance authority; (vi) greater coordination with upcoming international carbon markets.[10]

Improved regulation is required to sustain confidence in market mechanisms and enhance their efficiency, and could ultimately facilitate market growth, increase liquidity and promote a long-term price signal.

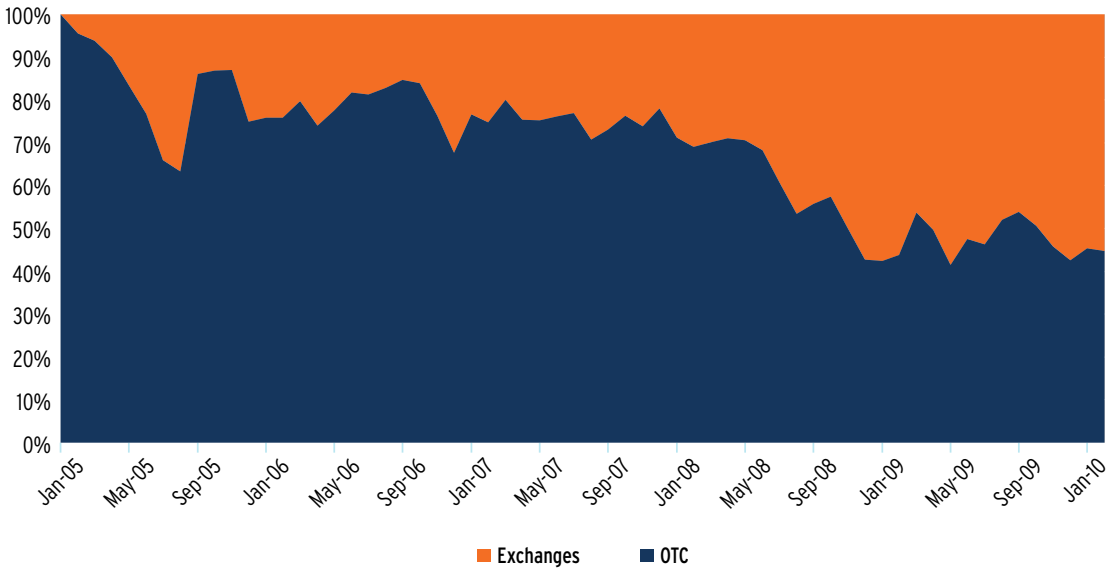


FIGURE 3
Transactions on exchanges versus OTC since 2005

Source: World Bank

[8] Motivated by the increasing volumes traded and cleared in the European exchanges and in anticipation of the Phase III auctioning of allowances, the U.S.-based Green Exchange announced in April 2010 its intention to open an office in London. Some of the most active European financial players are among the owners of the Exchange.
[9] VAT fraud, phishing, recycled CERs, etc. These topics are addressed in different sections of this document.
[10] République Française Ministère de l'économie, de l'industrie et de l'emploi, 2010, *La régulation des marchés du CO_2 - Rapport de la mission confiée à Michel Prada*.

BOX 1 An overview of VAT fraud

In countries that adopt the VAT, goods are taxable. EUAs traded on a spot basis are treated as actual goods and thus are subject to VAT, while futures and options carbon asset trades are considered financial transactions and thus are exempted from VAT within the European Union.

In many European jurisdictions, in cases where buyers and sellers are in different countries, the buyers (importers) are either exempted from VAT charges or are only invoiced for the VAT amount by their local tax authorities at some later stage (1–3 months). On the other hand, if buyers and sellers are in the same country the VAT is payable in cash on the transaction date of the purchase of EUAs (and CERs). Thus, an entity that imports from another EU country and subsequently sells the same assets domestically would effectively raise free finance equal to the VAT amount for a certain time period, i.e., from the date of the sale until the receipt of the VAT invoice for the purchase from the tax authorities.

Note that, although executing high volumes of trades with the purpose of maximizing the value of the VAT-based funding raised is an aggressive trading practice, it is not illegal and does not constitute fraud.

VAT fraud only occurs when a fraudster does not declare the VAT to the relevant government and disappears. Spot carbon trades became an easy target due to their relatively high value and ease of import and export (similarly to mobile phones and silicon chips). EUAs, in particular, are easily transferred across member states' borders through registries. In addition, transactions in the "carousel" typically happen in swift succession, thus maximizing the value that is generated as in spot trades, which intrinsically have rapid turnover. On December 9, 2009, Europol estimated that fraud resulted in a total of approximately €5 billion in lost tax revenue in several countries. However, experienced market analysts maintain that, based on the actual volume of asset transactions in the market and prevailing prices, fraud could not have reached that sum.

In response, by mid-2009 some of the countries that were most exposed to EUA transactions—including France and the United Kingdom—decided to take unilateral actions to deal with the problem and either reduced their VAT to zero, abolished it outright or introduced domestic reverse charging (i.e., the domestic purchaser, rather than the seller, is responsible for paying the relevant tax).

In September 2009, in a more coordinated response, the EU gave countries the option of applying a temporary reverse charging mechanism that would operate until 2014. However, such a solution would be subject to implementation challenges, making it likely that a broad reform of the EU VAT collection procedures might ultimately be needed to eliminate the risk that VAT fraud will proliferate.

In addition to the regulatory actions, Member States also took criminal measures and several states, including the United Kingdom, France, Spain, and Norway[1] have reportedly made several arrests.

[1] Although Norway is not an EU member, it participates in the EU ETS.

2.3.1.1 Carbon prices vis-à-vis other energy commodities

The economic downturn caused industrial output and emissions to fall in 2009, considerably easing the compliance needs of regulated entities. In fact, emissions fell 11.2% among the ETS installations that reported their data prior to the publication of this report (see Box 2).

In industries that suffered most during the recession, such as steel and cement, companies took advantage of the one to two month overlap between the issuance of 2009 allowances (February 2009) and the 2008 deadline for compliance (April 2009) and quickly sold their 2008 EUA allocations to raise cash (while relying on their 2009 allocations to cover their 2008 emissions). The most desperate industrials, in a move to roll over current liabilities and regain liquidity, borrowed against their 2010–12 allowances. As a result EUA spot and front contract prices fell further and faster than the prices of other commodities, breaking the strong price correlation between carbon and crude oil (see Figure 4).[11]

2.3.1.2 The many curves of the EUA market

In 2009, in addition to the sale of spot and prompt vintages, many entities, in particular utilities, sought to buy the tail EUA vintages under the assumption that they would no longer receive free allocations after 2012, and that they would therefore need to hedge their exposure to Phase III. As a result, the EUA price curve steepened significantly and at certain times resulted in a contango[12] that effectively yielded up to 250 basis-points over the EURIBOR out to December 2012. Nevertheless, during the recession funding costs rose dramatically (when funds were available at all), and few players had access to cheaper lending alternatives from local financial institutions. The curve began to flatten out only during the

[11] Bloomberg: Brent crude oil and EUA prices correlated at 95% in 2008 and 82% in 2007.

[12] Contango is a term used in the futures market to describe an upward sloping forward curve (i.e., futures prices are above spot prices). Antonym: backwardation.

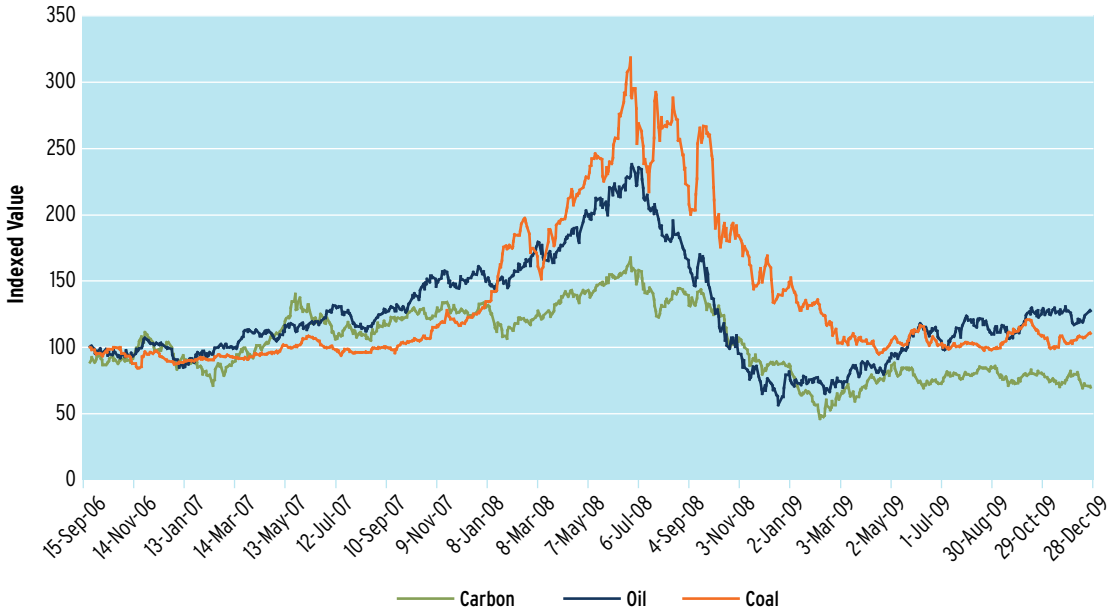


FIGURE 4
Comparison of carbon, oil, and coal prices, Sept. 06–Dec. 09

Source: World Bank

second half of 2009, when liquidity increased and the cost of funding declined.

The steepness of the curve can be seen in the first of the next three graphs (see Figure 5), from March 2009. The second graph shows how the curve flattened out in September 2009. The third graph, from March 2010, will be discussed later in this report, in the context of the secondary CER (sCER) market.

2.3.1.3 Déjà-vu in the EUA pricing pattern

EUA prices stabilized in the second half of 2009, only to fall again at year's end after the Copenhagen Climate Conference ended indecisively. Operators sold EUAs in the absence of a clear view of the environment in which the EU ETS would function post-2012. As a result, 2009's yearly pricing pattern took on a concave shape that mirrored that of 2008 (see Figure 6).

In the more stable economic environment of early 2010, industrials that have relatively strong cash positions have held their EUA surpluses (i.e., kept their length) in expectation of a short Phase III and a price increase in the near future. Dec13 EUA contracts have traded very actively since the beginning of the year, driven by demand from power companies that will no longer receive free EUAs in 2013 and are therefore starting to hedge their forward electricity sales. As the major price supporters in the Scheme, power companies' shortage hedging decisions will determine how quickly prices recover in coming months.

In general, with recovery fragile and weak, and amid concern that the recent crisis in some EU countries could lead the region into an economic "double-dip", growth prospects are low for 2010 and not much better for 2011.

Nevertheless, industrial activity is on the rise and, accordingly, demand for EUAs should grow modestly. In the near term power companies that are short on EUAs should drive the buyers' side since carbon prices are relatively low. Assuming that the economy and European energy market continue to recover, most analysts agree that carbon asset prices will rise at a moderate but steady rate throughout 2010, finally replacing the concave EUA graph of the last two years with an upward trending curve (forecasts from market analysts are provided in Section 5.1.2).

Cancún has a role to play in the materialization of this trend; another inconclusive international meeting might depress the market and lead to a new decline in prices.

BOX 2 The economic downturn deeply scarred Europe's emissions market

The recession led to a more dramatic decline in emissions than most players could have imagined. Based on data released on April 1, 2010,[1] GHG emissions from reporting EU ETS installations fell more than 11% in 2009, which is the biggest year-on-year drop since the EU ETS began in 2005. The data from 9,866 installations show that their total emissions decreased to 1.69 billion tons in 2009, 214 million tons less than in 2008. The same installations had an allocation of 1.75 billion allowances.

Polish utility PGE's Belchatow plant topped the list as the most emitting installation in the EU ETS for the second year running. In fact, the top 10 emitters were all power plants. Together, these 10 installations emitted over 10% of the total expected emissions for 2009. Emissions under the ETS are known to be heavily concentrated in a few companies. According to numbers provided by the EC on April 6, 2010, the EU ETS now covers around 11,000–11,500 installations owned by some 5,000 companies. While the 25 largest participating companies accounted for more than 50% of 2008 EU-25 emissions under the ETS the smallest 80% of installations accounted for about 10%. However, the generous allocations by Poland, Greece, and Italy shielded their industry from high compliance costs. Installations in Germany and the United Kingdom had to pay the most (i.e., 8 German power plants were among the 10 installations with largest allocation deficits, as were 2 United Kingdom power plants). At the other end of the scale, the 10 installations with the biggest surpluses were, not surprisingly, all steel plants.[2]

The numbers released on April 1, 2010 do not represent all ETS installations. The community independent transaction log (CITL) shows that over 1,400 installations have yet to report data for 2009. Still, the installations that reported their verified emissions accounted for 90% of emissions volumes in 2008 and constitute a good sample for projecting final 2009 numbers, which will be fully released by May 15, after completion of this report. As of the date of this writing, market analysts forecast that ETS emissions will total 1.87–1.88 billion tons in 2009.

As anticipated, Germany had the greatest drop in absolute emissions in 2009. German emissions fell by almost 40 million tons (or –8.4%) for those installations that reported data for both years. Estonia had the greatest percentage reduction in emissions at 23.8 percent. Luxembourg was the only country to report an increase in total year-over-year emissions.[3]

In 2008, market analysts forecasted that EU industrials would be long for Phase II. Those forecasts have been borne out in fact, as verified emissions have declined 18.3% vis-à-vis their 2008 levels. Among industrials, the steel sector was hit particularly hard by the recession, with total EU output declining by 33% year-over-year as of November 30, 2009.[4] In 2009, the EU cement industry contracted by 21% while the level of activity of other sectors covered by the EU ETS fell by 15.4%.[5]

In absolute terms the greatest declines were recorded by steel (–35 million tons), cement (–34 million tons) and refineries (–7 million tons). Utilities experienced relatively modest declines in demand, although they are still potentially short in this Phase and will need to hedge their future electricity sales beyond 2013. Total generation is expected to have fallen 5% in 2009 to 1,675 TWh, from 1,761 TWh in 2008.[6] Reported GHG emissions fell by 8.3% vis-à-vis 2008.

Germany's power sector has healthy margins (installed capacity/peak demand) that will be further secured if extensions (delays) are made in the country's nuclear phase-out program. In addition, Germany is heavily promoting the installation of additional wind capacity. As a result the country will not need new capacity, apart from what is already being built, over most of the coming decade. The degree of oversupply forecast for the system might encourage older coal plants to either merge or close. Once the free allocations of EUAs disappear, the closure decision will be easier.

The demand for power fell in the United Kingdom as well, causing generation to decline by 5% in 2009. Industrial recovery in the United Kingdom will likely proceed slowly—analysts predict a modest 0.4% increase in activity in 2010—so that any decisions to add capacity will be undertaken against a backdrop of moribund demand.[7]

[1] http://ec.europa.eu/environment/climat/emission/citl_en_phase_ii.htm
[2] Point Carbon, *Carbon Market Daily*, April 1, 2010.
[3] Data provided as of April 1, 2010.
[4] http://www.worldsteel.org/pictures/newsfiles/1109%20Production%20figures.pdf
[5] Information obtained from Deutsche Bank
[6] Barclays Capital, *Monthly Carbon Standard – Do the Right Thing,* March 17, 2010.
[7] Barclays Capital, *Monthly Carbon Standard – Do the Right Thing*, March 17, 2010.

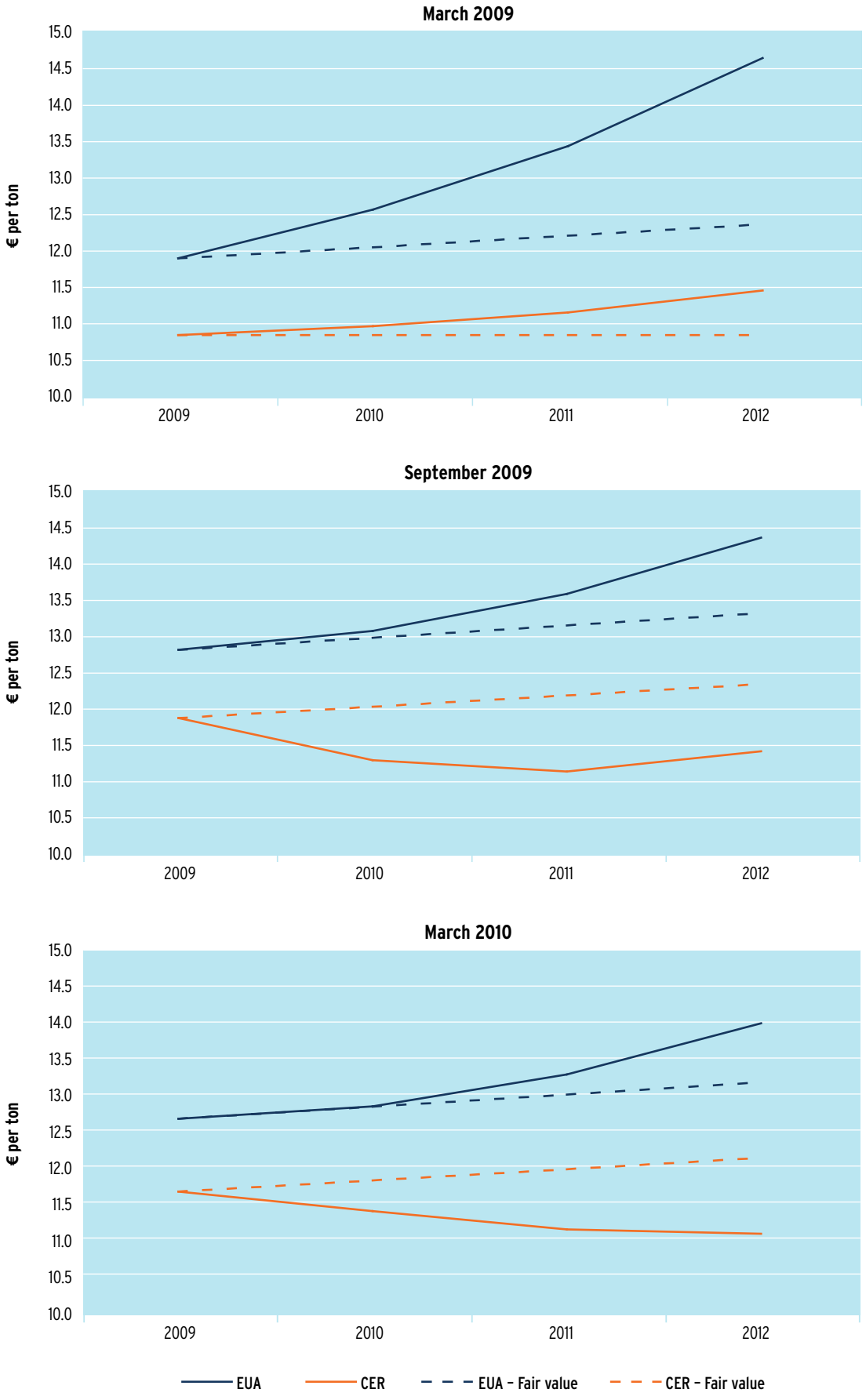


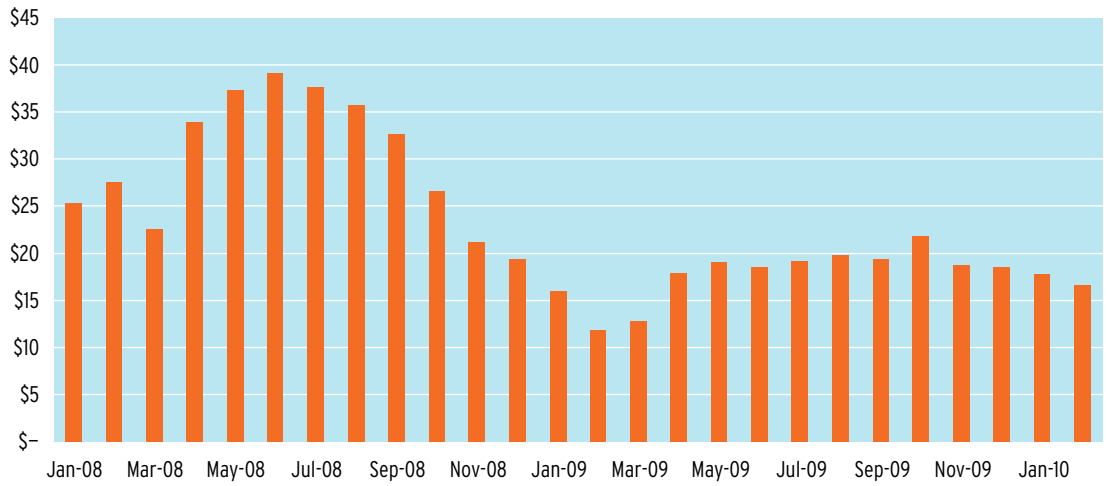
FIGURE 5
EUA and CER forward curves and fair value

Source: ECX and World Bank

Note: Fair value was calculated based on a rate of 1.3% per annum.

FIGURE 6
EUA average prices

Source: World Bank



2.4 SPOT AND SECONDARY CERS

2.4.1 Secondary market volume increases, prices fall

After the boom in 2008, sCER trading volume stalled in 2009, remaining just above one billion tons.[13] The heavy decline in the price of spot and sCERs caused overall market value to drop more than 30% to US$17.5 billion (€12.5 billion). The average price of a CER fell by 32% to US$16.6 (€11.9), versus US$24.5 (€16.8) in 2008, following the same pattern as EUAs. Futures accounted for 85% of transaction volume in 2009, while the nascent spot CER market grew substantially to 63.4 million tons and approached the volume of option contracts, which totaled 91.4 million tons.

Despite the fact that overall secondary CER volumes remained unchanged in 2009, origination activity declined as the financial crisis spurred financial institutions to deleverage—shed assets and raise capital—and redirect their positions from risky investments toward safer assets and markets (for additional information, please refer to Section 4.3).

In addition, the narrowing of the spread between primary and secondary CER prices no longer properly rewarded financial institutions for taking on balance-sheet risk.[14]

As the number of financial institutions active in the emissions market decreased, origination activity slowed down accordingly. Faced with a shortage of CERs, players that came out of the economic storm in relatively healthy condition acquired undervalued portfolios from the likes of struggling intermediaries and aggregators instead of dealing with the well-known burdens intrinsically related to CER and Emission Reduction Unit (ERU) origination activities. Under these circumstances the rate of market consolidation intensified.

[13] The numbers include 3.0 million tons sold by the Adaptation Fund (AF). The World Bank, as Trustee for the AF, is responsible for monetizing the 2% CER share of proceeds for the Fund in the spot market. Through early May, 2010, the AF sold 5.3 million tons, totaling US$91 m (€65.5 m). Although most transactions have taken place on BlueNext, almost 75% of volume has been traded on an OTC basis.

While the primary source of financing for the AF is the 2% share of proceeds, it also accepts financing from other sources. The first two donations to the AF were actually made in person—and in cash—during AF Board meetings held in Bonn during 2009, by a group of students from a German school (the donations amounted to about US$150 and US$170 respectively, denominated in Euro coins and notes). On April 29, 2010, the Government of Spain announced a €45 billion contribution to the Fund.

[14] The sCER business appeared as a needed market niche in which final buyers (e.g., Kyoto signatory countries, but mainly EU ETS installations with short-term—annual—compliance obligations) transferred underdelivery risk to healthy and creditworthy intermediaries, which took on that risk in exchange for a premium over primary market prices.

2.4.2 Rising liquidity causes offset price segregation to widen

European exchanges have primarily traded offsets generated from reductions in industrial gases such as HFCs and N_2Os, which constitute the bulk of CERs issued so far. The major exchanges have not traded ERUs due to the limited availability of those assets, nor have they traded assets that have been excluded due to eligibility issues.

In July 2009 the EU Member States adopted common rules for importing credits from large hydro projects (larger than 20 MW). The guidelines did not ensure, however, that EU governments would approve the credits using the same standards. The resulting uncertainty regarding the eligibility of large hydro credits led ECX to ban those assets from its platform.[15] As a result, those CERs have traded on an OTC-basis, at a reported discount of tens of Euro cents. A lack of liquidity and regulatory certainty has led to similar discounts in the price of spot ERUs versus CERs.

On the other hand, owners of the most desirable green assets, such as CERs from small renewable energy and energy efficiency projects in least developed countries, have preferred to bypass exchange platforms to avoid having their natural premium, reported to reach up to €0.50, from being diluted. In general, those assets have been traded OTC and subsequently cleared at the exchanges.

2.4.3 A shortage of CERs forces market players to adjust

In 2009 CER issuance fell to 132 million tons, 10% less than in 2008, and only 30 million tons of CERs were issued during the first quarter of 2010. A total of 400 million tons of CERs has been issued to date, well below the 700 million tons of CERs that the market forecast in 2007.[16] The suspension of Tüv Süd during the 53rd meeting of the CDM Executive Board (EB) served to accentuate the bearish European outlook on the capacity of CDM to generate compliance assets for the EU ETS.[17] By March 2010 the CER curve moved into full backwardation[18,19] (the EUA curve flattened but remained in contango) and price discounts deepened for each subsequent delivery year (see the third graph in Figure 5). The spread between the tail of the sCER and EUA curves widened to its greatest margin since the third quarter of 2009.

The ongoing backwardation of the CER curve reflects the deepening shortfall in the issuance of CERs and leaves sellers in the secondary market continuously in a short position to be rolled forward. In other words, due to the underdelivery in the project-based market the sCER sellers, including intermediaries and aggregators, do not have enough CERs to honor their delivery obligations and are forced to buy CERs on the spot market to cover their obligations.

2.5 THE OPTIONS MARKET: RISING VOLUME AND SOPHISTICATION[20]

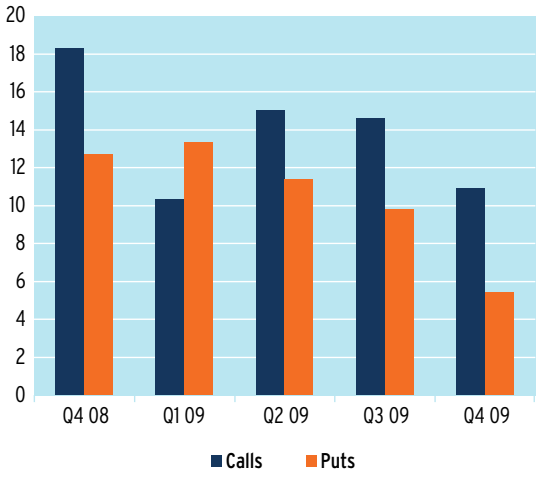
2.5.1 Sellers turn to call options to manage risk

As discussed above, CER sellers have often found themselves short in their delivery obligations and at risk of having to purchase CERs somewhere else at the last minute at a loss. The loss

[15] After consulting its carry members, on March 24, 2010 ECX opted to continue a ban on trade of large hydro CERs, reiterating its previous decision.
[16] Point Carbon, *CDM & JI Monitor*, March 31, 2010.
[17] The suspension of Designated Operational Entities (DOEs) is another blow to registration and issuance. The first suspension (e.g., DNV) occurred in December 2008—with reinstatement in February 2009. The second (e.g., SGS) happened in September 2009 with reinstatement three months later. Tüv Süd has been recently suspended (February 2010) as well as Kemco (partial suspension in March 2010). Together, DNV, Tüv Süd and SGS process almost two-thirds of the projects in the CDM pipeline.
[18] CER prices decreased as they moved further into the future.
[19] Backwardation: a downward sloping forward curve (i.e., the price of the future is less than the spot price of the underlying commodity). Antonym: contango.
[20] This section strongly benefitted from the input of several market players, in particular the generous and thoughtful insight provided by Lance Coogan of Gemini Carbon.

occurs when prevailing prices are higher than they were when the sellers sold the CERs forward. To manage against this risk sellers have increasingly chosen to buy call options ("calls"), causing the proportion of calls to grow in relation to put options ("puts") since late 2008 (see Figure 7). In 2009, 56% of the 91 million tons of CER options transacted were calls.

FIGURE 7
CER options volumes, Oct. 08–Dec. 09 (in millions)
Source: ECX



Looking at the prices of CER strike options, the strike prices of puts (which provide downside risk insurance if prices go down) are lower than the strike prices of calls (which provide upside risk insurance if prices go up). While the former reflects the break-even all-in costs from the CER investors, the latter can mostly be attributed to the large amount of 'collars' transacted, in which the premium received from the sale of calls is used to pay for the premium in buying puts. Put and call strikes straddle market prices (see Figure 8).

On the EUA side the volume of calls has historically exceeded that of puts, although the differential has fallen steadily over the years (see Figure 9). The share of calls declined from 89% of total options volume in 2006 to 59% in 2009. In the first quarter of 2010 the share of calls fell further to 54%. With the confirmation of a long Phase II in the EU ETS the volume of puts could continue to rise as participants attempt to manage their downside risk.

2.5.2 A broader perspective on the options market

The volume of the carbon options market passed the 500 $MtCO_2e$ mark and reached nearly US$10.6 billion in value in 2009.[21] EUAs accounted for 417 million tons while CER volumes totaled 91 million tons. EUA options prices were higher than those of CERs, and the market for EUAs was more liquid. EUA market value totaled US$8.9 billion in 2009, or 83% of the total options market value, while CER market value reached US$1.8 billion.[22]

In addition the market, which used to be dominated by banks and utilities, witnessed a growing presence of funds, energy-trading firms, and increasingly sophisticated utilities and industrials that used the options market for hedging (both volumes and prices) and profit-making transactions. As volumes spiked and dedicated players zeroed in on profit opportunities a number of heavy losses were registered as well.

As liquidity and sophistication have increased, the carbon options market has matured to the extent that it now behaves like many other options markets. The bulk of activity now comes from volatility and other relative value trades rather than asset-backed trades (i.e., financial and technical trades now account for a greater portion of market activity than do trades for compliance purposes).

[21] The authors, after consulting several market players, decided to evaluate the options market based on the strike price for each transaction. The approach is based on the fact that in most options markets the bulk of transactions are at-the-money options where the strike prices are similar to prevailing market prices. The authors also realize that this approach could lead to a skewed figure if a significant portion of those options are deep out/in the money options with strikes significantly higher or lower than the prevailing market prices. Frequently, however, the out-the-money strikes are traded symmetrically balanced around the at-the-money, hence giving a reasonable representation of market volumes. Using last year's methodology, 2009's options market would be valued at US$1.8 billion.
[22] Discrepancies in the values above are due to rounding.

2.5.3 Structures proliferate as players look to manage risk

A multitude of structures on the options market have become increasingly common as players look to manage risk or take positions. They include:

(i) The purchase of calls by utilities with compliance needs, sCER sellers that are short for delivery and market players that are bullish on prices or are simply using options as part of larger trading strategies (i.e., collars, strangles, straddles, volatility trades, relative value trades and inter-asset trades);
(ii) The sale of calls by players that are long (a so-called "soft hedge"), since the upfront premium from the sale reduces the downside risk, as well as the sale of calls by players that are bearish on future prices;
(iii) The purchase of puts by long EU entities (entities that are overallocated), project developers who only locked in ERPAs for a portion of their offsets, financials or intermediaries that purchased offsets at fixed prices and want to lock in profit and project asset value, and players that are bearish on future prices;
(iv) The sale of puts by entities that are short for compliance (a so-called "soft long"), since the premium from the sale of puts may help reduce the cost of compliance for installations vis-à-vis the purchase of calls, as well as sale of puts by players with bullish views (they will not get exercised if correct on future prices but still collect the premium).

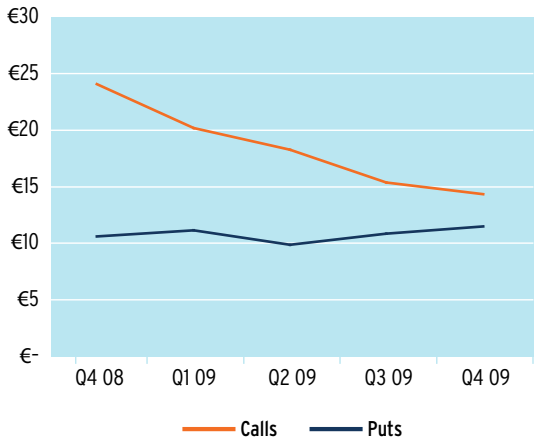


FIGURE 8
Quarterly average prices of CER strike options, Oct. 08–Dec. 09

Source: ECX

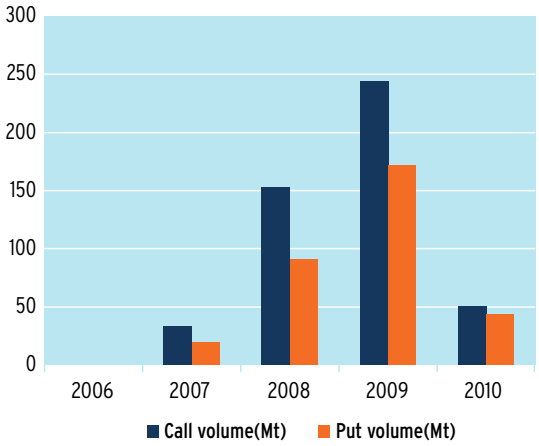


FIGURE 9
EUA options volumes, 2006–Q1'10

Source: ECX

2.6 WHAT LIES AHEAD FOR THE EU ETS?

The EU ETS is the only framework that currently promises to reduce greenhouse gasses after 2012, and Europe's political resolve may waver if other regions of the world fail to participate with their own carbon reduction schemes. Although it is unlikely that the EU and the EC will unravel the market mechanism that they have invested so much time and political capital constructing, the question remains as to how long the EU will continue to make a real effort to control its emissions while those of other regions grow unchecked.

Within the EU doubts are rising that other regions will take concrete steps to reduce their emissions. As a result, EU policy makers have begun to explore alternatives to level the playing field, including proposals to impose border carbon taxes on imported goods and progressive restrictions to the acceptance of Kyoto offsets entering the EU ETS (primarily from Non-Annex I OECD countries and large emitters). In addition, sector-based restrictions to the import of credits from countries that do not undertake their own domestic actions seem to have gained acceptance amongst policymakers.

BOX 3 The contentious history of Estonia and Poland's allocation plans

In 2007 the European Commission decided that certain aspects of the Estonian and Polish National Allocation Plans (NAPS) were not compatible with the EU ETS Directive. Essentially, the Commission ruled that both countries had overstated the volume of CO2 allowances they required for their 2008–12 National Allocation Plans. Both Member States brought an action for annulment against these decisions before the Court of First Instance.

On 23 September 2009, the Court of First Instance upheld the claims made in 2007 by Poland and Estonia, annulling the Commission's decision. On 3 December 2009, the Commission appealed against these judgments on a number of legal grounds but, as of the time of this report, no final judgment had been obtained.

The Court of First Instance's 2009 ruling has increased overall regulatory uncertainty. In terms of supply-demand impact, its decision to allow Estonia and Poland to maintain their initial NAP proposals theoretically could have opened the door to over 80 million tons of additional EUAs annually. Yet within the current context of economic recession, Poland and other countries now might not be able to justify their higher allocations. Furthermore the ruling has created a precedent under which six other Member States from Eastern Europe (Bulgaria, the Czech Republic, Lithuania, Latvia, Hungary, and Romania) have challenged similar EC decisions. Those challenges, if successful, could add another 164 million tons per year to the market, an increase of 8% in allowance volumes to an EU ETS Phase II that is already widely considered to be long.

In early April Poland decided to drop its claim for extra allowances and submitted a NAP with an overall cap that was unchanged from that defined in 2007 by the EC.[1] Estonia, however, has not accepted the revised allocation plan.

[1] As of April 10, 2010

2.6.1 Rules governing the use of CERs and ERUs in Phase III: still uncertain[23]

For existing installations 150 $MtCO_2e$ of additional credits will be allowed during the 2013–20 period (i.e., a total of 1,550 $MtCO_2e$ during 2008–20), versus the 1,400 $MtCO_2e$ limit during 2008–12. In addition, new entrants and new sectors, including aviation, could create demand for yet another 150 $MtCO_2e$ worth of credits over Phase III (about 50 $MtCO_2e$ each). The Commission will determine the exact volume ceiling through a consultation process ("Comitology")[24] by the middle of 2010. In summary, total demand for credits during 2008–20 should total 1,700 $MtCO_2e$,[25] based on the Phase II 1,400 $MtCO_2e$ limit.

Member States must also comply with the "effort sharing decision", which sets individual targets for sectors not included in the EU ETS (non-trading sectors). The annual credit limit for Member States is equal to 3% of 2005 emissions with some exceptions. On average, this translates into a maximum demand of 700–800 $MtCO_2e$ over 2013–20 (about 90–100 $MtCO_2e$ annually).

However, qualitative import restrictions may apply. During Phase III credits will no longer be *de facto* compliance units and their exchangeability into EUAs will be conditional. Absent a future international agreement, Article 11a (paragraphs 2–6 and 8–9) of the Revised ETS Directive will govern the acceptance of credits during 2013–20. In addition, CERs and ERUs issued before December 31, 2012 (CP-1) will have to be swapped with EUAs by March 31, 2015. Credits issued after 2012 (CP-2), but generated from projects registered before December 31, 2012, will be fully exchangeable throughout Phase III (until 2020). Finally, CP-2 credits from projects registered after December 31, 2012 will only be accepted (and swapped) if coming from a Least Developed Country (LDC).[26] The swap mechanism will be available to operators only; banks will be excluded.

Given the absence of an international agreement in December 2009 in Copenhagen, however, the

[23] For detailed information, please refer to the Annex I.

[24] Comitology is a simplified decision-making procedure within the EU. Decisions are taken by the Climate Change Committee, which consists of the European Commission and Member States officials. The EU Parliament is consulted in the process. Source: Point Carbon, *Use of CERs/ERUs in Phase 3: Questions and Answers*, March 19, 2010.

[25] This number corresponds to an average supplementarity limit of about 6% or less than half of the average supplementarity limit of Phase II, which average 13.4% of allocation or about 280 $MtCO_2e$ per year (1,400 million tons/5-y).

[26] According to the UN definition found at http://www.unohrlls.org/en/ldc/related/62/ as of October 2009 there are 49 countries and small islands on the list of LDCs, including 33 in Africa, 15 in Asia, and 1 (Haiti) in Latin America and the Caribbean.

BOX 4

Recycled CERs: one ton is one ton

Under Kyoto rules, CERs can be traded until the date on which signatory countries must comply with their obligations under the Kyoto Protocol[1] and Annex B Countries can choose to use a variety of compliance assets (AAUs, CERs, ERUs, RMUs) to meet their Kyoto compliance obligations. However, once an EU installation surrenders a CER to comply with its annual obligations, the CER cannot return to the European carbon market. If it did, the CER would in effect serve to offset more than one ton of GHG emissions.

One recent, high-profile event highlights the importance of the rules that govern the linkage between regimes that need to interact harmoniously. On March 11, 2010 the Hungarian government announced that it had sold 1.74 million CERs that previously had been surrendered for compliance to a Hungarian firm, Hungarian Energy Power Kft, for around €20 million[2] (800,000 of the CERs have been transferred). After subsequent trades those assets ended up returning to the ETS through spot transactions on the exchanges. Some brokers and banks reported having bought the recycled offsets on BlueNext without knowing they could not be used for EU compliance. The revelation that these assets were in circulation led to a quick collapse in bidding for spot CERs, and desperate sellers offered CERs for as little as €1.5 on BlueNext.

According to official statements from the Hungarian government and two subsequent traders, the deals were conducted on the condition that these credits would not be used in the European carbon market.[3] The Hungarian environment ministry confirmed that a number of AAUs, equivalent to the number of surrendered CERs that were re-sold, have been cancelled to comply with EU regulations and the proceeds from the sale would be channeled to a Green Investment Scheme (GIS), as occurs with AAU transactions.

In addition to Hungary, the Czech Republic, Germany, Italy, Lithuania, Luxemburg, the Netherlands, Poland, Slovakia, and Spain have yet to transfer the surrendered CERs they received after 2008 from their national registries' temporary accounts to their retirement accounts. A total of 61.8 million tons (out of the 84.2 million) surrendered in 2008 are estimated to still be in national registries. Those assets are, in theory, still available for re-sale.[4]

On February 17, 2010 the EC, in agreement with the Climate Change Committee, added an amendment to the Registries Regulation that prevents the re-entry of surrendered CERs into EU ETS operator and personal registry accounts. The amendment achieves this by implementing automatic flagging of CER status (as surrendered or not) in the Community Independent Transaction Log (CITL) and on the main exchanges, i.e., ECX and BlueNext.[5]

Because the amendment is not scheduled to enter into force until August 2010, on February 18, 2010 the EC announced an interim measure, effective March 19, that suspends the process for surrendering allowances, ERUs and CERs "... until the application of the new rules in the amended Registries Regulation, except for the period between 19 April 2010, 8:00 CEST and 1 May 2010, 8:00 CEST. This allows for an appropriate time period for the surrender of allowances or credits by operators for compliance with 2009 emissions by the 30 April 2010 deadline, while protecting the integrity of the European carbon market."[6]

On April 16, 2010, by amending the EU ETS Registries Regulation, EU countries hopefully brought to an end the issue of recycled CERs.

[1] A countries' cumulative emissions should not exceed its Kyoto limit for the period 2008–12.
[2] According to Point Carbon (March 22) the chief of the Hungarian ministry of environment said three firms, including HEP and Asian companies, placed serious bids for the used CERs and the government sold the credits to HEP, as its €9–9.50 bid was the highest.
[3] According to the Hungarian government the contract stated: "Buyer acknowledges that CERs that are the subject of the sale and purchase agreement cannot be sold and used in the emission trading system of the... EU ETS."
[4] Société Générale, *Commodities weekly*, March 15, 2010.
[5] The loophole came from the fact that the built-in check is downstream in the transaction chain (i.e., at the point of surrender) and a compliant ETS installation might unknowingly purchase a surrendered CER, only to become aware after the fact.
[6] http://ec.europa.eu/environment/climat/emission/index_en.htm, March 19, 2010

Directive opens the possibility for the acceptance of CP-2 credits originating in non-LDC countries that have entered into bilateral agreements with the EU. If and when a new international agreement emerges, the provisions mentioned above will still apply. In addition, more stringent EU reduction targets would apply in an ambitious agreement scenario, which would consequently boost demand for project-based credits. Provisions dealing with this scenario would also apply under a new international agreement.

2.6.2 Auctions and benchmarking

In Phase III, 88% of allowances will be distributed among the Member States according to

their relative share of emissions and 10% will be distributed to the Member States with the lowest income levels per capita and highest growth prospects, for solidarity purposes. The remaining 2% will be rewarded to the Member States with the greatest GHG emission reductions based on their Kyoto targets and on their 2005 benchmark.

During the first trading period (2005–07), Member States auctioned a very limited number of carbon allowances. During Phase II the lion's share of allowances continues to be allocated for free although generally larger quantities are being auctioned. Germany will auction an average of 40 million EUAs per year during Phase II,[27] while the United Kingdom will auction 17 million allowances per year on average. The Netherlands, Austria, Ireland and Hungary combined are expected to auction 6.9 million EUAs on average per year.[28]

The Revised ETS Directive of December 17, 2008 foresees a fundamental change at the start of the third trading period. Beginning in 2013 auctioning will become the default method of allowance allocation, although sectors and sub-sectors that are at risk of carbon leakage[29] will still be eligible for free allocation. These sectors account for an estimated quarter of total emissions covered by the EU ETS and around 77% of the total emissions from manufacturing industry in the EU ETS.[30] Fully 65% of emissions covered by the ETS come from the power sector, which will cease to receive free allowances in 2013, although there will be a limited number of exemptions to aid the modernization of the electricity sector in some Member States.

The number of free allowances that will be given to industrial installations will be decided in 2011 on the basis of common performance benchmarks,[31] which should be determined by the end of 2010. Under the Directive, industrial sectors will receive 80% of benchmarked allowances for free in 2013, with the percentage decreasing annually to 30% in 2020. Full auctioning to all installations in all sectors will occur by 2027. Sectors that are exposed to carbon leakage will receive 100% of the benchmarked allowances for free throughout Phase III.

The benchmarks will reflect the average performance of the top 10% of installations in terms of efficiency (i.e., with the lowest greenhouse gas emissions) in a sector or subsector in the EU over the years 2007–08. The benchmarks will be calculated by product and will take into account "the most efficient techniques, substitutes, alternative production processes, high efficiency cogeneration, efficient energy recovery of waste gases, use of biomass and capture and storage of CO_2, where such facilities are available."[32] Benchmarks will therefore create additional incentives for ETS installations to reduce emissions and improve energy efficiency. Given the stringency of the benchmarks, only the most efficient installations have a chance of receiving all of their allowances for free.

The following are some relevant steps in the allocation process[33] and the latest on early auctioning:

[27] Part of the proceeds (i.e., €120 million per year) is being used to support 180 climate-friendly projects in developing countries and economies in transition through the International Climate Initiative.
[28] http://ec.europa.eu/environment/climat/emission/auctioning_en.htm
[29] i.e., companies in sectors subject to strong international competition and that might relocate from the EU to third countries with less stringent constraints on greenhouse gas emissions.
[30] EC press release of September 18, 2009 following approval by the Member States: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1338&format=HTML&aged=0&language=EN&guiLanguage=en and http://ec.europa.eu/environment/climat/emission/pdf/wg3_16_sep_presentation.pdf
[31] The community-wide ex-ante benchmark has been chosen as the allocation methodology to avoid perverse effects of grandfathering and because it has the potential to ensure a non-distorted carbon price signal. The benchmark rewards early action and carbon efficiency (Centre for European Policy Studies): http://www.ceps.eu/system/files/task_force/2009/07/ExSum%2520to%2520post%2520on%2520website.pdf.
[32] Directive 2009/29/EC of the European Parliament and of the Council, April 23, 2009 (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0063:0087:EN:PDF)
[33] All quotes are taken from the Revised ETS Directive.

- "By 31 December 2009 and every five years thereafter, after discussion in the European Council, the Commission shall determine a list of the sectors or subsectors…" that are exposed to a significant risk of carbon leakage and possibly will continue receiving free allocation. On December 24, 2009 the EC provided a list of sectors and subsectors that are exposed to a significant risk of carbon leakage. [34]
- "By 30 June 2010, the Commission shall adopt a regulation on timing, administration and other aspects of auctioning..." and "submit to the European Parliament and to the Council an analytical report assessing the situation with regard to energy-intensive sectors or subsectors that have been determined to be exposed to significant risks of carbon leakage."[35]
- "By 31 December 2010, the Commission shall adopt Community-wide and fully-harmonised implementing measures for the allocation of the allowances …".
- "In order to ensure an orderly functioning of the carbon and electricity markets, the auctioning of allowances for the period from 2013 onwards should start by 2011 and be based on clear and objective principles defined well in advance."

On November 30, 2009 Eureletric, the association representing Europe' electricity industry, sent a open letter to the EU governments stating that by 2012 EU utilities will need to have acquired around 1.2 to 1.4 billion EUAs to cover the CO_2 exposure on their forward electricity contracts for 2013 and beyond. Eureletric indicated that 450–650 million Phase III EUAs would need to be auctioned early (i.e., before 2013) to meet demand.[36]

On December 15 the EC requested clarifications[37] and, on January 22, 2010, Eurelectric replied with a comprehensive document containing data from RWE and forecasts from Deutsche Bank and Société Générale[38] that support the need for early auctioning. In addition, the document presents Eurelectric's views on the differences between the carbon market and other commodities markets and points out the resulting pricing implications for carbon market players.[39] It also concludes that the market is subject to significant political risk.

In the initial Phase III Directive from October 13, 2003, the EC determined that 300 million EUAs would be set aside from the Phase III New Entrants' Reserve (NER) to incentivize the development of innovative clean technologies and Carbon Capture and Storage (CCS). Those EUAs shall be available by December 31, 2015.[40] However, In February 2010, it was agreed that the European Investment Bank (EIB) would sell 200 million of these EUAs in 2011 to fund demonstration plants across the EU. The EIB will sell the remaining 100 million EUAs in 2013.[41]

---

[34] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010D0002:EN:NOT

[35] On April 6, the EC sent a proposed Auctioning Regulation to the Member States (http://ec.europa.eu/environment/climat/emission/pdf/proposed_auctioning_reg.pdf), accompanied by an Impact Assessment (http://ec.europa.eu/environment/climat/emission/pdf/ia_auctioning_final.pdf), but no indicative auctioning volumes.

[36] http://www2.eurelectric.org/DocShareNoFrame/Docs/1/KKMFHGJCJOONFCILJFFDIHJA3ASOQHU6U-6434LUJ5E5T/Eurelectric/docs/DLS/Auctioning_-_EURELECTRIC_letter_to_EU_Governments_30112009-2009-030-1017-01-E.pdf

[37] http://ec.europa.eu/environment/climat/emission/pdf/auction_eurelectric.pdf

[38] http://ec.europa.eu/environment/climat/emission/pdf/eurelectric.pdf

[39] "Carbon is unlike other commodity products and this is reflected in the psychology of the carbon market—which differs to that of other markets. The most obvious differences are that: there is no supply side response to price, externally imposed penalties apply for over-use and all operators with compliance obligations are naturally short in the long-run. As a consequence, operators with compliance obligations behave in a more conservative manner than would be the case for participants in any other market e.g. fuels. This has obvious implications for price formation as demonstrated by the fact that today a significant positive price applies to allowances despite the fact that the market in the current Phase 2 is known to be long."

[40] http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2003L0087:20090625:EN:PDF

[41] http://www.ner300.com/wp-content/uploads/2010/02/DRAFT-NER300-Decision.pdf

SECTION 3

EMISSIONS TRADING IN OTHER ANNEX B REGIONS AND BEYOND

3.1 NEW ZEALAND: AT LAST! **On November 25, 2009, New Zealand's Parliament passed the Climate Change Response (Moderated Emissions Trading) Amendment of 2009, ending a year of uncertainty on the future shape of New Zealand's carbon regulation.[42] New Zealand's ETS, which had covered forestry since 2008, is now the first mandatory, economy-wide scheme outside Europe. The government recently announced, however, that full implementation could be delayed if adequate progress is not made in establishing similar regulations in other developed countries. International entities have already been major purchasers of New Zealand's forestry carbon assets.**

New Zealand's Amendment includes measures that will ease the economic impact of the scheme. Government-issued NZ ETS allowances (New Zealand Units or NZUs) used for compliance purposes during 2010–12 will have a fixed price of NZ$25 (US$18 or €13). Stationary energy, industrial process and liquid fossil fuel installations will need to surrender just one NZU per two tons of CO_2e emitted over 2010–12. Emissions-intensive industries that are exposed to international trade will receive the bulk of their allocations for free and agriculture, which will not be included in the scheme until 2015, will receive free allowances as well. These measures, most notably assistance in the form of free allocation, closely align New Zealand's ETS with Australia's now postponed Carbon Pollution Reduction Scheme (CPRS).

3.1.1 Progressive extension of ETS scope to cover the entire economy

The NZ ETS will progressively regulate emissions of the six Kyoto gases in all sectors of the economy by 2015. By July 1, 2010 the scheme will regulate stationary energy, industrial process and liquid fossil fuels for transport, which together accounted for nearly half of the country's emissions in 2008, excluding Land Use, Land Use Change and Forestry (LULUCF).[43] Synthetic gas and waste will join the scheme by January 1, 2013 and ag-

[42] Legislation for the NZ ETS was passed by Parliament on September 10, 2008, covering retroactively forestry (starting January 1, 2008). In November 2008, the newly-elected government suspended (except for forestry operations) the barely started ETS, which it deemed too onerous, and launched a review of the country's climate change policy. By the end of August 2009, the Select Committee Review (a parliamentary review panel) concluded that a carbon trading scheme covering all economic sectors was preferable to a carbon tax, although design recommendations remained relatively general.
[43] New Zealand's emissions (excluding LULUCF) totaled 74.7 $MtCO_2e$ in 2008, almost entirely from energy (including transport) and agriculture, in equal parts. Sinks removed 26.2 $MtCO_2e$ and offset about one-third of New Zealand's emissions (excluding LULUCF). Source: National Inventory Submission 2010.

riculture, which accounted for 48% of emissions excluding LULUCF in 2007, will join by January 1, 2015. In the case of transportation fuels, regulation will take place upstream at the level of refiners and importers to limit the complexity and cost of regulation.[44] Agriculture will be regulated upstream at processing sites, fertilizer importers and production facilities. New Zealand continues to refine its allocation rules.

3.1.2 No emissions cap

During the transition period (2010–12) there will be no cap on emissions since there will be an unlimited supply of allowances. Entities will, however, be accountable for their emissions and will need to purchase allowances when emissions exceed their free allocation.[45]

For compliance during the transition period regulated entities will have the choice of surrendering the free NZUs allocated to them (if applicable), purchasing NZUs in the market (i.e., from the forestry sector) or purchasing government-issued allowances at the fixed NZ$25 price. These government-issued NZUs are available in unlimited supply. They can only be surrendered; they cannot be banked or sold. New Zealand expects its total emissions to be below its Kyoto Protocol target (with a projected surplus of 11.4MtCO_2e over 2008–12).[46] The transition arrangements, including the "two-for-one" provision, should not change this.

During the transition phase the NZ ETS will expand progressively and adjustments will be made to optimize workability. Installation-level data will be collected, rules governing allocations in widely differing sectors will be tested and entities will have time to familiarize themselves with the scheme and develop lowest-cost compliance strategies. The scheme will undergo a review in 2011 that will take into consideration the overall effectiveness of ETS operations, the establishment of new schemes in other developed countries and the potential for linking to those schemes, and the extent of free allocations. No cap has yet been announced for 2013 and thereafter. With uncapped assistance on an intensity-basis (see Section 3.1.3), it could be challenging to keep the ETS target in line with New Zealand's international commitment, reiterated under the Copenhagen Accord, to reduce emissions by 10% below 1990 levels by 2020 or, if a comprehensive global agreement is reached, by 20%.[47]

3.1.3 Allocation rules and transition assistance

Emission-intensive, trade-exposed industries (including agriculture) will receive free allowances on an intensity basis with progressive phasing-out. The intensity-based free allocation is intended to encourage efficiency improvements without penalizing increases in production or putting businesses at a competitive disadvantage in the international marketplace. Free allowances will not be granted to industries that are not trade-exposed, such as electricity generation and liquid fossil fuels.

The assistance package has been designed to closely align with Australia's proposed CPRS rules (see Annex II), and will apply to activities rather than installations or sectors. The scheme will grant two levels of assistance, either 60% or 90% of the allocation baseline,[48] depending on the carbon-intensity of output. The carbon-intensity test will measure an installation's relative intensity for the

[44] About 200 installations should be regulated by 2013, excluding forestry (where tenure may be fragmented), voluntary opt-ins, and synthetic gas.
[45] This led some observers to characterize the NZ ETS as a hybrid between a cap-and-trade and a tax scheme.
[46] See http://www.mfe.govt.nz/issues/climate/greenhouse-gas-emissions/net-position/index.html
[47] This means: (i) the global agreement sets the world on a pathway to limit temperature rise to not more than 2°C; (ii) developed countries make comparable efforts to those of New Zealand; (iii) advanced and major emitting developing countries take action fully commensurate with their respective capabilities; (iv) there is an effective set of rules for LULUCF; and (v) there is full recourse to a broad and efficient international carbon market.
[48] Agriculture will directly benefit from the 90% rate, irrespective of any test.

activity in question, and compare it both to the activity's countrywide average and to intensity thresholds.

Arguably, the scheme should send appropriate incentives to installations that pollute in excess of the national average. Furthermore, if the national average is below thresholds then the activity itself will not be eligible for assistance. Free allocations will be given in advance, based on the previous year's output with a reconciliation mechanism once the actual output is known. Phasing-out will start in 2013 (2016 for agriculture) at a rate of 1.3% per year. Given the "two-for-one" rule in effect during the transition period, the number of free allocations will be halved.

3.1.4 Cost control: full supplementarity for Kyoto-compliant offsets

In addition to the temporary fixed-price provision, participants from stationary energy, industrial process and liquid fossil fuel sectors need surrender only one NZU for every two tCO_2e emitted during the transition period so that the maximum price they would pay would be half of the fixed price of NZ$25 or NZ$12.5 (approx. US$9 or €7). Both measures will disappear after 2012. Full banking is allowed, although borrowing will be prohibited. A NZ$30 make-good penalty applies for non-compliance, with a waiver for repentant installations.[49]

Certain international units can also be surrendered for compliance in unlimited quantities, such as CERs (excluding tCERs and lCERs), ERUs and RMUs. No decision has been reached on whether foreign AAUs will be allowed. In any event, they will not be bankable beyond 2012. During the transition period non-forestry NZUs cannot be exported, in order to avoid any possible arbitrage between domestic unlimited public supply at a fixed price and demand in other markets. Exportable NZUs are automatically converted to AAUs for export (pending government approval, which may be a risk for forward transactions); AAUs linked to forestry projects have already piqued the interest of foreign buyers (see Section 3.1.5).

The NZ ETS is open to linkage with other schemes such as the EU ETS, but no decision has been made on whether to bilaterally accept compliance units. There are a number of issues to be considered before bilateral acceptance can occur: what will be the level of ambition of the foreign scheme and which partner will ultimately benefit from a decreasing domestic price; which sectors will be covered and under what allocation modalities, including assistance; will there be price intervention mechanisms that can propagate through linking, such as a price cap; what types of credits will be allowed and will MRV standards be compatible.

3.1.5 Interest in the forestry market takes root

Forestry currently offsets about one-third of New Zealand's non-forestry GHG emissions. However, by 2020, forestry is expected to become a net source of emissions as large areas of production forests planted in the 1990s start to be harvested.[50] Forestry, however, has played a very limited role in Kyoto-compliant markets internationally,[51] and the bulk of carbon finance activity in agriculture and forestry has taken place within the framework of voluntary carbon markets.[52]

[49] The NZ ETS Q&A reads: "Q: What happens if I fail to surrender emission units when I'm required to? A: If you fail to surrender emission units when you're required to or have surrendered less units than you were meant to, you'll have to surrender or cancel those units and pay a penalty of [NZ]$30 for each emission unit. This penalty may be reduced by up to 100 percent if you state voluntarily that you've failed to surrender the required emission units or made a mistake in your emissions return before the administering agency sends you a penalty notice or you're visited by an enforcement officer."

[50] Source: Fifth National Communication by New Zealand.

[51] Kyoto-compliant LULUCF assets have so far accounted for less than 1% of volume in the CDM and JI primary market, mainly because of their ban from the EU ETS (chiefly motivated by their non-permanent nature).

[52] Historically, the voluntary OTC market dominated forestry carbon market, with close to three-quarters of volumes transacted. The forestry carbon market has continued to grow, with two-thirds of volumes traded in the last three years

> By including forestry in its ETS, New Zealand hopes to rein in deforestation and encourage new plantations as well as more sustainable forest management practices.

By including forestry in its ETS, New Zealand hopes to rein in deforestation and encourage new plantations as well as more sustainable forest management practices. Experience from the first two years of operations demonstrates that New Zealand's unique approach to forestry helped sellers receive the highest prices ever for compliance forestry assets, almost on par with other project types transacted in the CDM market. This is in particular due to the permanent nature of these forestry credits that has resulted from a credible land-tenure system with long-term commitments and liabilities for forest owners.

Under the NZ ETS, all major owners of pre-1990 forests (or vested third parties) incur a deforestation liability for harvesting and not replanting. NZUs will be granted to compensate for the reduced flexibility in the use of land.[53] Post-1989 forest owners can voluntarily opt-in. They can receive NZUs for any increase in carbon stocks from January 1, 2008 onwards; in the meantime, they face a liability whenever carbon stocks fall below a previously reported level. Projects under the Permanent Forest Sink Initiative, a scheme that pre-dates the NZ ETS and allows partial harvesting, will also be issued NZUs.

These credits can be sold at home or abroad (in the form of AAUs). Given the long-lived uncertainty surrounding the fate of the NZ ETS, pre-compliance interest in forestry NZUs within New Zealand has been extremely limited while international buyers (essentially Europeans) that have been looking for AAUs with a high level of environmental integrity have shown much greater interest. In 2009 international public and private buyers purchased a total of up to 600,000 forestry NZUs on the spot market at prices believed to be around US$14 (€10). The Government of Norway purchased 520,000 AAUs in the largest transaction thus far. With more clarity now on the domestic front in New Zealand, large compliance buyers (including utilities that won't be granted NZUs) have reportedly explored the option of buying forestry carbon assets.[54] In 2010 the number of NZUs is expected to increase significantly, with up to 6 million to be issued into the registry accounts of sellers; about 610,000 forestry NZUs were transacted in Q1'10.

Although the NZ ETS is an incipient market with uncertainty in terms of demand and choice of compliance options, activity should pick up in the second half of 2010 when three new sectors join the scheme (not all of which will receive generous assistance). However, the newly mandated installations may adopt a wait-and-see attitude, especially in light of the government's announcement regarding the implementation of the NZ ETS. They may take more time to explore and bargain in the domestic forestry NZU market while the NZ$25 price cap gives them the certainty they need to plan their overall obligation.

3.2 AUSTRALIA: ON HOLD

Australia has been strongly divided on how to progress with its stalled climate policy. Legislation for the proposed Carbon Pollution Reduction Scheme (CPRS), an economy-wide emissions

(including in relation to NZ ETS). However, with just 20.8 $MtCO_2e$ transacted for a value of US$149.2 million, forestry still accounts for a small fraction of the global carbon market. See: Katherine Hamilton, Unna Chokkalingam, and Maria Bendana, 2010, *State of the Forest Carbon Markets 2009: Taking Root & Branching Out*. Ecosystem Marketplace, Washington (DC).

[53] The Pre-1990 Forest Land Allocation Plan, still under consultation, is expected to be finalized this year.

[54] See forward purchase of NZUs by the generator Mighty River Power http://www.mightyriverpower.co.nz/News/Detail.aspx?id=2288

trading scheme that could become Australia's central instrument to manage GHG emissions, was defeated twice in the Senate last year. Citing both domestic political deadlock and uncertainty on future international climate policy, Prime Minister Rudd announced on April 27, 2010 that plans for emissions trading in Australia would be postponed and re-examined by the end of 2012. The CPRS would have covered approximately 75% of Australia's emissions and put the country on track to meet its mid-term commitment of reducing GHG emissions by at least 5% below 2000 levels by 2020. Annex II describes in more detail the CPRS legislation as introduced for the third time into Parliament, in February 2010.

The Renewable Energy Target (RET) scheme, which the government implemented in August 2009, may be the only *de facto* environmental market currently active at the federal level that could deliver emission reductions. The RET aims to achieve a 20% share of electricity supply from renewable energy sources by 2020 (a doubling of its current level). This was a four-fold increase over the goal of the Mandatory Renewable Energy Target (MRET) scheme introduced in 2001, and it has stimulated the market for Renewable Energy Certificates (RECs). RECs currently trade above AU$40 per kWh (US$37, €27), which roughly corresponds to AU$47 per tCO_2e (US$43, €32). The RET scheme will be enhanced further from January 2011 to stimulate additional participation from households, large-scale renewable energy projects and installers of small-scale renewable energy systems.

3.3 JAPAN: CONSIDERING MARKET MECHANISMS

On March 12, 2010, the government of Japan proposed the "Basic Act on Global Warming Countermeasures", an overall climate change policy framework that is in line with its mid- and long-term GHG emissions reduction goals.[55] In a major shift of Japan's climate policy (which thus far has mainly excluded market-based approaches and price instruments), the Basic Act considers establishing a mandatory ETS, introducing a carbon tax and putting in place a feed-in tariff for all renewable energy sources. The ETS would start within one year after the Basic Act comes into force, and the carbon tax would become active in April 2011.

> "Prime Minister Rudd announced on April 27, 2010 that plans for emissions trading in Australia would be postponed and re-examined by the end of 2012."

The Basic Act also sets a goal of increasing domestic energy generation from renewable sources to 10% of total primary energy supply by 2020.[56] The Basic Act, to date just an outline, was submitted to the current Diet Session, which should end in June. Under the outline the government would prepare a series of implementation laws that would lay out a master plan and detailed design for each measure prior to the start of the next Diet Session in the fall of 2010.

Opposition to the proposed bill is growing, fuelled by concerns about costs to the economy and a lack of extensive consultations with industry groups. Three leading business organizations, including the Japan Business Federation (Nippon Keidanren), have already announced their overt opposition. Observers expect a fierce battle over the ETS and believe that it could take more than the originally scheduled one year to iron

[55] As is: a 25% reduction in GHG emissions below 1990 levels by 2020, premised on a fair and effective international framework in which all major economies participate and on an agreement by those economies on ambitious targets (as reiterated under the Copenhagen Accord). There is also a long-term target of reducing GHG emissions by 80% below 1990 levels by 2050.

[56] In 2007, Hydro, Geothermal, Solar sources as well as Combustible Renewables and Waste accounted for 3% of Japan's total Primary Energy supply (IEA).

> In a major shift of Japan's climate policy (which thus far has mainly excluded market-based approaches and price instruments), the Basic Act considers establishing a mandatory ETS, introducing a carbon tax and putting in place a feed-in tariff for all renewable energy sources.

out legislation. However, implementation of the carbon tax and feed-in tariff system could happen sooner.

One of the most contentious issues so far has been whether participants under the mandatory ETS could choose an intensity-based target. While the draft bill did not initially make any reference to an intensity-based approach, such text was inserted at the last minute as the result of inter-ministerial coordination. The Basic Act considers setting the caps as absolute amounts of emissions in principle, but it would also require the government to consider intensity-based reduction targets in terms of units of production or some other measure of output. While it is hoped that a Japanese ETS would generate large demand,[57] the types of emission reductions that would be eligible have yet to be determined. Observers believe that Japan would take an open stance toward offsets in terms of volumes and types (including REDD).

In October 2008 a voluntary Experimental Integrated ETS was launched. As of July 2009, 715 organizations had applied to participate, of which 521 supplied targets. The trial scheme aims to bring together several existing initiatives such as the Keidanren Voluntary Action Plan, plans for a domestic offsets scheme and the Japan-Voluntary Emissions Trading Scheme (J-VETS), which targets smaller emitters. Potential participants must apply to take part in the Experimental Integrated ETS and submit their own emission reductions targets (either absolute or intensity-based) for review. In addition to their own internal abatement efforts, participants can meet their compliance objectives using domestic allowances, offsets from domestic projects or Kyoto Mechanisms. The scheme covers about 70% of CO_2 emissions from industry although targets and the level of effort to be invested in the scheme are not yet known. It is therefore difficult to assess whether the trial scheme could generate significant demand for international offsets. Transaction activity is reported to be extremely limited so far.

While plans for a national mandatory ETS are under development, the Tokyo metropolitan area launched its own mandatory cap and trade scheme on April 1, 2010 that targets office and commercial buildings (including universities) and factories. Altogether, the scheme covers approximately 1,400 installations and 1% of the country's emissions. Unlike other ETS, the scheme covers the service sector and regulates its energy use (rather than power generation upstream), and thus is likely to include a large number of installations with small liabilities. To ease compliance and transaction costs, smaller businesses are likely to receive subsidies to improve their energy efficiency. The scheme will help Tokyo achieve its target of slashing emissions by 20% below their 2000 levels by 2020. Over 2010–14, participants will be required to achieve reductions of 6–8% (6% for industrial sites) below a baseline set as the average emissions from three consecutive years during 2002–07. This will be followed by deeper cuts (17%), from 2015 to 2020. To meet their targets, instal-

[57] At 1,282 $MtCO_2e$, Japan's GHG emissions in 2008 were 7% above its Kyoto target (6% below 1990 levels). While use of Kyoto Mechanisms by the government of Japan and promotion of carbon sinks could close two-thirds of the gap, use of Kyoto Mechanisms by the private sector could close a large part of the remainder. Average expected GHG emissions over 2008–12 in Japan could thus range around the base year level while the 2020 target calls for reducing them by one quarter, generating hopes of a significant demand for offsets.

lations can reduce emissions internally, purchase credits from entities that overperform, surrender RECs or acquire domestic offsets from SMEs. A maximum of one-third of the reduction attributable to offsets can originate outside the Tokyo metropolitan area. Trading is expected to start in the next fiscal year after emissions data are collected in 2010. Failure to attain a reduction goal will be sanctioned during the next phase at 1.3 times the default amount.

3.4 NORTH AMERICA: WAITING FOR K-G-L AND GETTING K-L

Market activity grew four-fold in North America during 2009 in response to mounting expectations of federal carbon regulation and the growing momentum of regional initiatives, chiefly the Regional Greenhouse Gas Initiative (RGGI), the only mandatory cap-and-trade scheme in the United States (see Box 5). The passage of the Waxman-Markey Bill in the U.S. House of Representatives in June 2009 considerably increased interest in U.S. domestic offsets. However, slow subsequent progress on Federal legislation caused enthusiasm to fizzle by the end of 2009. Hopes now hang on a multi-partisan bill sponsored by Senators Kerry and Lieberman (K-L), although the window of opportunity for passing federal climate legislation in 2010 is closing fast given other legislative priorities and upcoming mid-term elections in November. In Canada, Alberta continued its intensity-based program while other Canadian provinces agreed to implement their own carbon reduction plans.[58]

> “...the window of opportunity for passing federal climate legislation in 2010 is closing fast.”

3.4.1 The Waxman-Markey Bill raised hopes...

In a narrow vote on June 26, 2009, the U.S. House of Representatives passed the American Clean Energy and Security Act of 2009, or ACES (proposed by Congressmen Henry Waxman and Ed Markey), which would impose a mandatory economy-wide cap-and-trade scheme aiming to reduce emissions from covered sources to 17% below 2005 levels by 2020.[59] The Waxman-Markey Bill also includes companion provisions to increase renewable energy generation and enhance energy efficiency, such as a federal renewable energy standard,[60] energy-saving standards and funding for low-carbon technologies and energy efficiency.

ACES leaves ample room for offsets as a key cost-containment option,[61] allowing up to 2 billion tons of offsets per year (or close to 40% of the average annual cap over 2012–20) equally split between domestic and international activities, although international offsets will be discounted at a 1:1.25 ratio starting in 2018. Recent analysis by the EPA indicates that demand for offsets could be significant, on the order of 0.76–1 billion tons annually for international offsets, while the use of domestic offsets would ramp up progressively.[62] With regard to international offsets, activities that

[58] Since July 2007, facilities in Alberta that emit more than 100,000 tCO_2e per year are required to reduce their carbon intensity by 12% annually. To comply, they can, among other options, purchase Alberta-based offset credits.
[59] In line with a 15% reduction (below 2005 levels) in total U.S. emissions by 2020. The U.S. long-term emission reduction goal is 83% below 2005 levels by 2050.
[60] The Renewable Energy Standard requires that 20% of the electricity sold by retailers be produced through renewable energy sources in 2020. Energy efficiency and conservation measures (with possible crediting and trading under a market mechanism) as well as Renewable Energy Certificates (RECs) can be used towards this target. Alternatively, regulated entities can opt for a compliance payment of US$25 per MWh.
[61] Other cost containment provisions include unlimited banking, unlimited borrowing from the immediately following year, limited borrowing (15% of obligation) with an 8% interest rate for future vintage years 2 to 5 years into the future, and buying allowances from a strategic reserve through auction. Finally, allowances from other trading programs at least as stringent as the U.S. scheme can be used.
[62] EPA (2010). *EPA's January 2010 supplemental H.R. 2454 analysis*.

BOX 5 Focus on North America

Kindly provided by Bloomberg New Energy Finance, Ecosystem Marketplace

RGGI was by far the most prominent market in North America with 805 $MtCO_2e$ traded for an overall value of almost US$2.2 billion in 2009, its first full year of operations. This represented a 10-fold increase over (pre-market) activity in 2008 in terms of both volume and value. RGGI allowances traded at an average of US$3.3 per tCO_2e during 2009 (or significantly less than EUAs) in an over allocated market—a situation that could continue for many years unless the caps are revised. Activity was greatest during Q3'09 in the wake of the passage of the Waxman-Markey Bill in the U.S. House of Representatives, yet fell markedly in Q4'09 when the Senate failed to maintain momentum for a climate change bill.

TABLE 2 North American carbon market – traded volumes and values, 2008–09

	Average Price (US$/$tCO_2e$)		**Volume** ($MtCO_2e$)		**Value** (million US$)	
	2008	**2009**	**2008**	**2009**	**2008**	**2009**
RGGI (Allowances)†	3.9	3.3	61.9	805.2	198.2	2,178.6
Alberta (Offsets/EPCs)	10.0	13.5*	3.4	4.5	33.5	60.8
CCX (CFIs)	4.4	1.2	69.2	41.4	306.7	49.8
Voluntary Offset Market	6.8	4.9	15.4	29.0	104.1	143.4
of which CAR	*8.8*	*7.1*	*5.3*	*14.9*	*46.6*	*104.5*
of which CCX	*4.8*	*0.8*	*1.0*	*7.4*	*4.8*	*5.9*
of which VCS	*5.5*	*4.6*	*1.5*	*3.3*	*8.3*	*15.2*
of which ACR	*3.8*	*3.4*	*4.3*	*1.8*	*16.3*	*6.1*
of which Other	*8.5*	*7.3*	*3.3*	*1.6*	*28.1*	*11.7*
Total market			**149.9**	**880.1**	**642.5**	**2,432.5**

Source: Bloomberg New Energy Finance, Ecosystem Marketplace. Notes: † RGGI includes quarterly auction figures, * Alberta price is an estimate.

The passage of Waxman-Markey also created a flurry of activity in the offset market as many companies focused on procuring offsets that might become eligible in a future federal compliance market. As a result, transactions of U.S.-based project credits nearly doubled in 2009. In particular, the Climate Action Reserve (CAR) protocols proved to be very popular as they are considered very likely to become eligible under a federal scheme. As Table 2 shows CAR credits were the main growth driver in the U.S. carbon market with volumes nearly tripling (180% growth). CAR credits represented 51% of the offset market in terms of volume at an average price of US$7.1 per tCO_2e—much higher than many of the other U.S. carbon credits (e.g., CCX, VCS or ACR).

Although congressional deliberation of the Waxman-Markey Bill during the first half of 2009 created momentum for the U.S. offset market, it did not spur equivalent growth for CCX. CCX had grown consistently from its start in 2004, but it suffered a 40% decline in trade volume during 2009 (from 69 $MtCO_2e$ to 41 $MtCO_2e$). Prices dropped sharply, from US$4.8 per tCO_2e to US$0.8 per tCO_2e, as did overall value, which was only 16% of that of that in 2008. Interest in the exchange seemed to wane when CCX credits were not explicitly mentioned for future eligibility in a federal compliance regime and general market over-allocation.

reduce deforestation at national, state or project levels are explicitly mentioned as being eligible, in contrast to their status in other existing or proposed ETS (see Box 6).[63] However, complete offset regulation (e.g., a list of eligible activities and existing accepted methodologies, guidelines for the establishment of new methodologies and eligibility conditions for international offsets)

[63] ACES also provides for a mechanism whereby allowances are set aside to fund deforestation reduction activities in developing countries. Such activities are not eligible to generate offsets.

remains to be developed, raising some concerns regarding the actual availability of offsets in the early years of the scheme.

As the first comprehensive climate legislation adopted by a house of Congress, the Waxman-Markey Bill created significant momentum. Pre-compliance interest rose quickly in the domestic offset market, notably around the Climate Action Reserve (CAR) protocols, which are very likely to be compatible with a future federal compliance market.

3.4.2 ...but momentum is at risk

With slow progress toward companion legislation in the Senate, momentum faded through the end of 2009 and into early 2010. Over this period, prices of RGGI allowances and Climate Reserve Tonnes (CRTs), which are project-based emission reductions issued under the CAR, continued to fall, reflecting declining market expectations. In an effort to overcome dissent within the Senate, Senators Kerry, Graham and Lieberman (K-G-L) prepared a multi-partisan bill through a series of compromises. The draft American Power Act (APA) was finally released on May 12 by Senators Kerry and Lieberman only as Senator Graham withdrew in April on disagreement over immigration reform. APA seeks to reduce U.S. emissions economy-wide by 17 percent below 2005 levels by 2020, and creates a cap and trade scheme that covers utilities starting in 2013 and expands to manufacturing in 2016. Emitters are allowed to use annually up to 1.5 billion of domestic offsets and 500 million of international offsets.

Observers are divided on the likelihood of success, pointing optimistically to a number of earlier concessions on nuclear power and oil drilling but at the same time aware of the political capital cost of having passed health care reform. All agree, however, that the window of opportunity for passing federal climate legislation in 2010 is closing fast, given other legislative priorities and mid-term elections in November. State and regional initiatives are also impacted by the electoral deadline. In California, a state that has been a leader in climate action and that could be an anchor of the Western Climate Initiative (WCI), a leading gubernatorial candidate is openly against AB32.[64] WCI has experienced serious setbacks as Arizona and Utah have pulled out of its trading program, while necessary legislation in Montana, Oregon and Washington won't likely be in place until 2012.[65]

> "As the world strives to scale up global mitigation efforts, many developing countries are in the process of formulating their national climate strategies and aligning them with their overall development plans."

3.5 EMERGING ALTERNATIVE MARKET INSTRUMENTS AND EXCHANGES BEYOND ANNEX B COUNTRIES

As the world strives to scale up global mitigation efforts, many developing countries are in the process of formulating their national climate strategies and aligning them with their overall development plans. These strategies will identify and frame their nationally appropriate mitigation actions (NAMAs) that are expected to be the primary vehicles for them to contribute to global mitigation efforts while achieving domestic priorities. Creating adequate incentives to support these mitigation actions remains a challenge.

[64] See glossary for more information on regional initiatives.
[65] A thorough analysis of regional North American market potentials can be found in Point Carbon, 2010, *Plan B – Doing it alone: Regional Programs in North America*.

While public sources of finance will likely remain crucial to the delivery of such support, there is broad recognition that market instruments could have a complementary role in supporting and enabling the cost-effective achievement of national priorities. This is now evident through the development of trading schemes/exchanges, often with indirect links to GHG emission reductions, and overall preparation for introducing market instruments in many countries.

Brazil: Policy makers are considering introducing a domestic cap and trade scheme, primarily covering the energy, transport, industrial and agribusiness sectors. This is intended to help Brazil meet its voluntary national target of reducing emissions by up to 38.9% by 2020.[66] The scheme would allow both polluters and investors to trade allowances. Most sectoral targets are still to be defined, although it is likely that thermal power plants will be capped first. Implementation would be supported by creating a new regulatory body and accrediting auditors to monitor and verify data. The proposed scheme continues to face internal opposition but is expected to progress by COP 16 in Mexico.

China:[67] Three voluntary environmental exchanges were established in Beijing, Tianjin and Shanghai in 2008 through private sector collaborations with approval from municipal governments. These are pilots for testing the use of domestic emission trading as a tool to support China's climate change mitigation strategy, but do not involve the central government.

- The China Beijing Environmental Exchange (CBEEX) provides a market platform for trading various environmental commodities including CO_2.[68] Its current operations include developing the voluntary 'Panda standard' for the creation of domestic GHG offset assets in the agriculture and forestry sectors with social co-benefits. The CBEEX also facilitates CDM transactions and is generating market demand for VERs through the China Carbon Neutral Alliance and a VER Carbon Fund of RMB0.5–1 billion capitalized by the member companies.
- The Tianjin Climate Exchange (TCX) is China's first integrated exchange for the trading of environmental financial instruments. Its focus is similar to the CBEEX, but also promotes energy efficiency through an intensity-based emissions trading, particularly for heating suppliers. The first sale was in February 2010. After the pilot phase, the Tianjin plan may be extended to cover all public, commercial and residential buildings and their heating suppliers.
- The Shanghai Environment Energy Exchange (SEEE) provides a platform for trading asset rights, creditor's rights, stock rights, and intellectual property rights, focusing on environment and energy. It is exploring a new market mechanism aligned with the requirements of the Clean Development Mechanism. The exchange is intended to reduce transaction costs and bring more transparency to CER pricing.

India:[69] The National Action Plan on Climate Change included several programs on energy, and specifically the use of market-based instruments to increase energy efficiency and the use of renew-

[66] A range of domestic actions will contribute towards this voluntary target, including signification reduction of deforestation (80% for the Amazon and 40% for the "Cerrado"), restoration of grazing land, diversification of energy sources (notably hydro and biofuels) and improvement in energy efficiency. Source: http://unfccc.int/files/meetings/application/pdf/brazilcphaccord_app2.pdf

[67] China will endeavor to lower its carbon dioxide emissions per unit of GDP by 40–45% by 2020 compared to the 2005 level, increase the share of non-fossil fuels in primary energy consumption to around 15% by 2020, increase forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 from the 2005 levels. Source: http://unfccc.int/files/meetings/application/pdf/chinacphaccord_app2.pdf

[68] This is a partnership with BlueNext and two other co-founders, Winrock International and China Forestry Exchange (CFEX).

[69] India will endeavor to reduce its emissions intensity by 20–25% by 2020 compared to 2005 level. The emissions from agriculture sector will not form part of the assessment of emissions intensity. Source: http://unfccc.int/files/meetings/application/pdf/indiacphaccord_app2.pdf

REDD-plus

BOX 6

CoP15 confirmed that forests would play an important role in future climate change mitigation. In particular, reducing emissions from deforestation and forest degradation, the conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks in developing countries (a package now referred to as "REDD-plus") is likely to receive a significant portion of the fast-start money announced in Copenhagen. It is also expected that, in the long term, both public and private funding will be directed toward forests, including possibly through carbon market mechanisms. But before a market for REDD-plus credits appears, important preparatory steps must be taken, what is commonly known as "REDD-plus Readiness".

The international community has built enormous expectations for REDD-plus, in particular developing countries which see the potential for financing development policies and programs in return for reducing forest-related emissions and for maintaining or increasing forest carbon stocks. Meanwhile, private sector initiatives are cautiously starting to engage, as they are both perceiving investment opportunities in the REDD-plus area but also mindful of the lack of clear signals about the future rules and criteria of regional, national, and international climate change regimes, including those of the UNFCCC, the United States, the European Union, Australia, Japan, and others. Currently, therefore, public interest and finance are dominating the agenda and concerted efforts will now be needed to design systems that also attract private capital to support national efforts to reduce emissions and enhance stocks.

Despite the limited breakthroughs achieved at the Copenhagen conference, the REDD-plus agenda did progress significantly in technical and political terms. A number of important issues were agreed upon, starting with the scope of REDD-plus, which now covers all major components of forest-based climate change mitigation. While this is good news for forest countries and the overall climate-change agenda, this comprehensive approach requires a more complex national framework (e.g., in terms of monitoring systems) to accommodate the three additional activities, and also more ambitious financial support packages form the international community.

In Copenhagen, methodological guidance on REDD-plus was agreed upon by the Subsidiary Body for Scientific and Technological Advice. With respect to policy approaches and positive incentives, the Parties deliberated in the context of the Ad Hoc Working Group on Long-term Collaborative Action (AWG-LCA). The working group reached agreements on key topics, e.g., the place of REDD-plus in national development, and the environmental and social safeguards that need to be taken into consideration when undertaking REDD-plus activities. Overall, only a few undecided (i.e., bracketed) passages still remain in the AWG-LCA text. Nevertheless, these may prove important as the private sector decides whether to engage in REDD-plus on a large scale. In particular, the discussion about the level at which REDD-plus should be implemented and accounted for is still unfinished.

For now attention is focused on the public sector's response, including through the financing pledges announced. At Copenhagen, six countries (Australia, France, Japan, Norway, the United Kingdom, and the United States) pledged US$3.5 billion of fast-start support for REDD-plus between 2010 and 2012. Since then, additional countries have joined (including the European Union, Germany, Slovenia, and Spain), bringing total fast-start pledges for REDD-plus to over US$4.5 billion. In parallel, France and Norway built on the momentum created at Copenhagen and convened a large number of countries to design a non-legally binding interim "REDD-plus partnership", which is designed to confirm and detail the financial pledges and set up an institutional structure for REDD-plus to coordinate action through 2012, and would be replaced or subsumed by a future UNFCCC mechanism including REDD-plus.

Most countries agree that whether or not sub-national implementation is permitted, accounting will ultimately have to be conducted at the national level to account for the possible displacement of emissions (leakage). In reality, most countries already allow the design and implementation of voluntary REDD-plus projects. However, there is still no guidance on how these sub-national programs should link up to a national accounting system and how they will be managed and coordinated to address issues such as permanence, coherent reference emission levels, and measurement, reporting and verification (MRV).

The great variety of regulatory and technical issues that need to be addressed during REDD-plus Readiness has motivated most of the countries to start organizing their readiness process in a cross-sectoral manner, including relevant line ministries and non-governmental stakeholders. Many REDD countries show unprecedented commitment to, and expectations of, REDD-plus and are working towards the development of a common vision of how best to manage their forest estate and shape their REDD-plus strategies. While some countries are making quick progress, each country is advancing through REDD-plus Readiness at its own pace. Some countries may

Continues on the following page

BOX 6 REDD-plus *(continued)*

well take several years to fully address the regulatory and MRV requirements associated with REDD-plus.

Forest countries are supported in their REDD-plus Readiness efforts by a number of bilateral donors and several main multilateral initiatives, namely the Forest Carbon Partnership Facility (FCPF), the UN-REDD Programme, the Forest Investment Program (FIP), and the Global Environment Facility (GEF). These initiatives aim to provide forest countries with technical and financial support as they progress from REDD-plus Readiness to investments and results-based activities.

The inclusion of Indigenous Peoples and other forest-dependent communities in the REDD-plus context also represents noteworthy progress, recognizing their critical role and special knowledge in protecting and monitoring forest areas.

The magnitude of finances required for REDD-plus (on the order of billions of dollars per year) requires the involvement of the private sector. Official development assistance alone will not be able to carry the weight. The question is therefore what will motivate the private sector to contribute to scale. The carbon market could provide one of these incentives if REDD-plus credits were declared eligible in regulatory regimes. The passage of a cap-and-trade bill by the U.S. House of Representatives in 2009 initially raised hopes that the United States might generate a large demand for such credits. However, the prospect of passage of a similar bill by the U.S. Senate has become a lot less certain recently, including the question whether federal legislation would eventually make room for REDD-plus credits (offsets). Pending the passage of legislation in the United States or elsewhere, the demand for REDD-plus is limited to the public sector and the voluntary market.

Currently, a number of voluntary REDD-plus programs are being developed, though most of them are at a very early stage and follow different methodologies, standards and approaches. Standards such as the Voluntary Carbon Standard and the Climate, Community and Biodiversity Alliance are being used for project development. It is not clear how these standards will be integrated into the logic of a national accounting system for REDD-plus.

In the current interim finance and readiness phase for REDD-plus, it will be important for regional, national, and international regulators not to lose sight of the private sector's interests, as it seems obvious that a large portion of funding for REDD-plus will have to come from private sources in the future. The public sector should ideally help design frameworks that will catalyze private funding.[1]

[1] The Carbon Fund of the World Bank's Forest Carbon Partnership Facility (FCPF), which is aimed at testing and demonstrating first-of-a kind, large-scale REDD-plus emission reductions transactions, is designed to be such a public-private partnership.

able energy. The government is also exploring linking these two schemes.

- The Perform Achieve and Trade (PAT) mechanism for trading energy efficiency certificates is expected to become operational in 2011, with an initial commitment period of three years. The scheme will cover 714 installations in 9 energy-intensive sectors. By 2014 the scheme is expected to generate 98 million tCO_2 in emission reductions per year.
- The Renewable Energy Certificate (REC) mechanism is intended to support an increase in installed renewable capacity from 15–65 GW in five years and is expected to become operational in 2011. RECs will only be issued to renewable energy generators, but will be freely tradable. RECs will be traded through regulator approved power exchanges, within a price band.

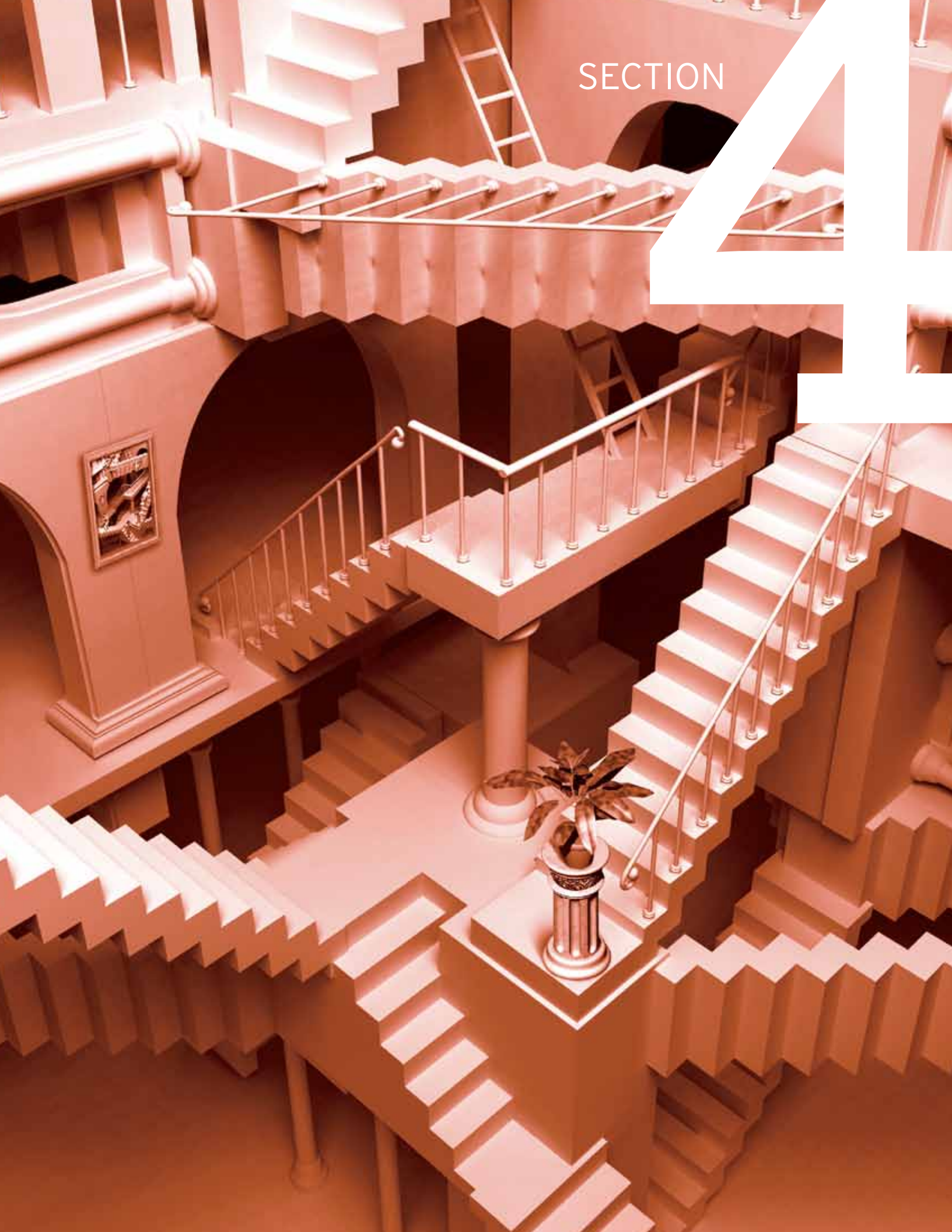
Mexico:[70] The voluntary program for greenhouse gas accounting and reporting (Programa GEI)

[70] Mexico aims to reduce its GHG emissions by as much as 30% with respect to the business as usual scenario by 2020, provided that adequate financial and technological support from developed countries is provided as part of a global agreement. Source: http://unfccc.int/files/meetings/application/pdf/mexicocphaccord_app2.pdf

[71] The Republic of Korea intends to reduce its national GHG emissions by 30% from the business as usual emissions scenario by 2020. Source: http://unfccc.int/files/meetings/application/pdf/koreacphaccord_app2.pdf

covered 98 companies in 2009 accounting for 21% of national emissions. The program operates a validation/certification system of GHG inventories, establishes baselines, and develops standards, thereby providing essential capacity building for future participation in the carbon market. In the next two years the coverage will be expanded to 80% of national GHG emissions. Sectoral crediting is expected to complement CDM as the source of carbon market finance for Mexico.

Republic of Korea:[71] The Korean Certified Emission Reduction (KCER) Program is a project-based GHG reduction program operated by the government. This has been introduced to assist with meeting the 30% below BAU by 2020 voluntary mitigation target. KCERs are issued by the government for five-year crediting periods to projects with annual reductions of 500 tCO_2e or more and benchmarked using CDM and ISO standards, and IPCC guidelines. The KCERs are either purchased by the government for US$5 per KCER, sold into the voluntary market or banked in preparation for emissions trading. A trading scheme is being developed through the Basic Act for Low Carbon Green Growth and will be finalized by the fall of 2010.


SECTION
4

KYOTO FLEXIBILITY MECHANISMS

4.1 AT A GLANCE For the second year in a row, the level of activity of the Kyoto offsets market declined substantially (see Table 3 and Figure 10).

	2008		2009	
	Volume ($MtCO_2e$)	Value (US$ million)	Volume ($MtCO_2e$)	Value (US$ million)
Primary CDM	404	6,511	211	2,678
JI	25	367	26	354
Voluntary market	57	419	46	338
Total	**486**	**7,297**	**283**	**3,370**

TABLE 3
Annual volumes and values for project-based transactions, 2008–09[72]

Sources: World Bank, and Bloomberg New Energy Finance and Ecosystem Marketplace for data on the voluntary market

On the demand side, the EU ETS was buffeted by global economic turmoil in 2009. As emissions fell demand for Kyoto assets declined, leading to an overall surplus in allowances over the remainder of Phase II. At the same time, most Annex B Parties suddenly found themselves on track to meet or overachieve their commitments under the Kyoto protocol.

On the supply side, origination activity declined in 2009 as the financial crisis spurred financial institutions and private investors to deleverage and redirect their positions away from risky investments and toward safer assets and markets, leading to a major reduction in the capital inflow to developing countries, as well as an outflow of resources already internalized. The combination made it impossible for many CDM and JI project developers to lock in finance, and as a result, project origination ground to a halt during H1'09.

Simultaneously, many buyers exited the market (e.g., primarily EU compliance "naturals" with lower demand needs and EU financials heavily hit by the financial crisis and credit crunch), while those that remained became much more risk averse and stringent in their choices.

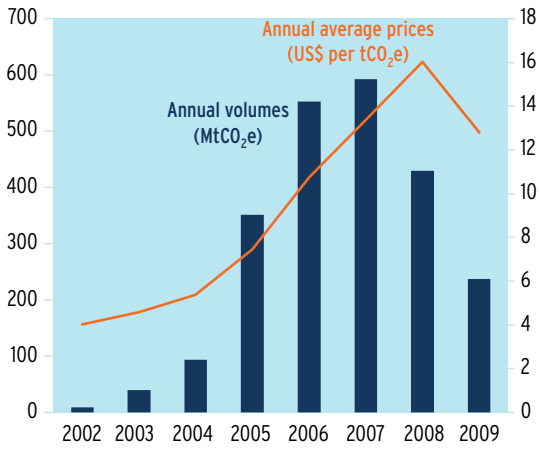


FIGURE 10
Volumes and prices for Kyoto offset transactions (CERs and ERUs) since 2002[73]

Source: World Bank

[72] Please note that small differences between the numbers reported this year and last reflect additional information obtained after the last report was released concerning earlier transactions.

[73] Although not specifically mentioned throughout the text, an evaluation of the primary market purely based on year-to-year volumetric comparison can be misleading since the volumes provided in this report refer to the remaining potential delivery through 2012, which declines every year. Therefore, in order to provide an accurate overall evaluation of market behavior in the primary market, other aspects such as the number of project-based transactions concluded, potential post-2012 volumes, level of engagement and appetite for risk (based on contractual clauses) have to be taken into consideration.

> Buyers sought to reduce risk by focusing on projects that attained financial closure. However, sellers could not secure underlying finance, an unfortunate catch-22!

Delays in asset creation (e.g., validation and registration of CDM projects) are an inherent risk equally distributed across the CDM portfolio and beyond the control of buyers. Therefore, buyers sought to reduce risk by focusing on projects that attained financial closure. However, sellers could not secure underlying finance, an unfortunate catch-22!

In addition, reasonably healthy EU financials saw greater opportunity in acquiring undervalued CER portfolios from distressed and liquidity-short actors than in seeking new projects, leading to further contraction in demand and the intensification of the market consolidation process that had begun in 2008. After the economic storm subsided, activity resumed in the second half of 2009. Although portfolio diversification remained a major goal for buyers, as it had been in 2008, China retained the lion's share of the offset origination market, due in part to the difficulty in finding equivalent business environments in other countries.

The JI market fared no better, with only a few deals being confirmed, primarily from the Russian Federation and Ukraine. As the health of the offset market declined the volume of AAU deals increased, with the Czech Republic and Ukraine as the major sources.

There is a growing sense among market players that the CDM market has reached a crossroads. We remain too far from an international agreement, which is needed to provide long-term price signals, and we are coming too close to 2012, when the certainty of offset demand disappears. Additionally, pessimism has grown regarding the likelihood that the U.S. and Australian emissions markets will emerge anytime soon, while restrictions in the import rules under Phase III of the EU ETS threaten the market for post-2012 assets. Finally, in a major setback to aspirations for a robust compliance market, the inconclusive Copenhagen summit failed to provide post-2012 visibility.

Without greater visibility the primary market will become increasingly directionless and prone to following speculative actions, rumors, short-term commodity trends and the actions of the few who will seek to close their positions. Under this scenario it is likely that even lower volumes and higher short-term price volatility will emerge.

4.2 pCERs: ANOTHER TOUGH YEAR

4.2.1 Pre-2013 ERPAs: layering, syndicating and much more

With no room for additional financial losses, the market became very risk-averse. Buyers focused their attention on the few remaining large projects that were in advanced stages of development and run by well capitalized and experienced project developers. The number of advance payments declined as risk aversion increased and, critically, the window of opportunity to generate enough assets to repay the amount advanced closed. Simultaneously, appetite for innovative financial structures backed up by carbon assets, which were explored by a few financials in the past, disappeared.

Delivery guarantees from primary CER sellers have proven very difficult to enforce (almost all projects have underdelivered and it is too costly for financials and intermediaries to run after the guarantee). Thus, the practice of requesting such guarantees has lost traction. Instead, for the larger deals, buyers have sought risk mitigation through "layering" (i.e., umbrella agreements that include several potential projects at a single site and/or are managed by a single project proponent) and syndication (i.e., two or more buyers share risk by splitting the assets to be generated by a project).

The few capitalized buyers that during the crisis remained in the market, Japanese firms included, relied on a spectrum of package solutions to fur-

ther dilute their carbon risk. Solutions included purchasing a portion of a project's offsets and brokering the remaining offsets on a tentative basis, supplying equipment, offering services and providing finance which, alongside creative ERPA commercial terms based on a combination of different prices for firm volumes and options, allowed buyers to purchase in China at "all-in" carbon conditions below NDRC's floor price thresholds.

The vast majority of deals were contracted at fixed prices, which ranged from €8–10 for primary CERs (pCERs) in 2009. In addition, a few buyers that maintained origination activities during H1'09 reportedly fetched good bargains by taking advantage of the lack of competition and the desperation of some sellers.

Many buyers exited the market, while some investors, such as pension funds, expressed interest in entering, yet refrained from doing so due to the poor visibility in the offset market. There were, however, a couple of courageous large entrants that sought to diversify their activity at the margin of their energy and commodity activities.

Fears abound that the exit of additional players will send strong signals to investors and lead to a severe demobilization of market infrastructure, as teams and expertise flee to other businesses.[74] In the future, decisions to rebuild shredded infrastructure and reengage in the market will likely require much more certainty and time than they did a few years ago, when the business environment was upbeat.

"Fears abound that the exit of additional players will send strong signals to investors and lead to a severe demobilization of market infrastructure, as teams and expertise flee to other businesses."

4.2.2 Who, how and what in 2009?

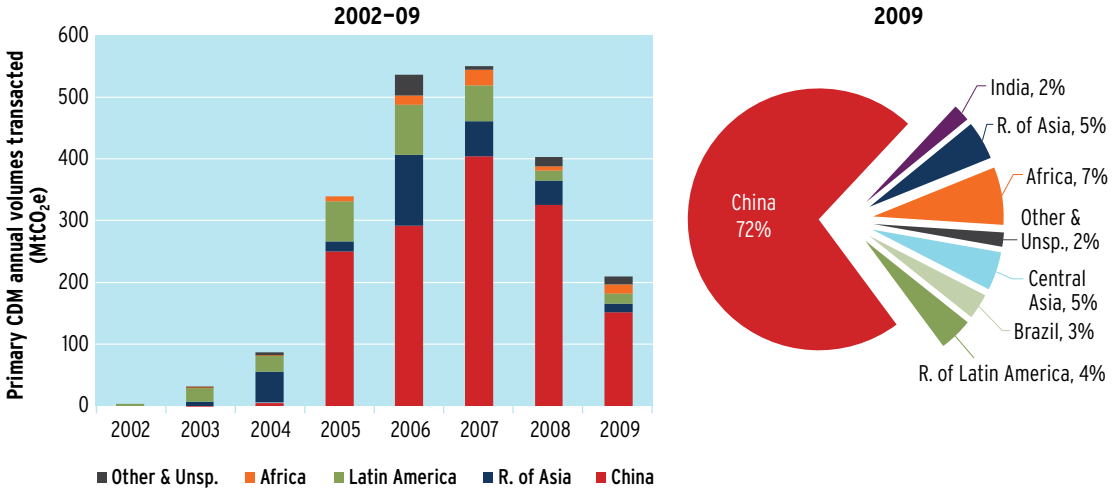
All-in, 211 million tons were contracted on the primary CDM market in 2009, a significant 48% decline from 2008 volume (and an even more dramatic 62% decline vis-à-vis 2007). However, as both supply and demand were similarly hit by the economic downturn competition for the best assets kept prices from falling as much as volumes. Prices averaged US$12.7 per ton (€9.1), a still relevant 21% decline compared to the US$16.1 average in 2008. Summing both impacts, the total value of the primary CDM market in 2009 fell to US$2.7 billion, 59% less than the US$6.5 billion transacted in 2008.

Buyers often found it prohibitively difficult to arrange deals in developing regions: the South East Asian market was extremely competitive, the Indian market was too commercially aggressive and dealing with the Latin American market was too time-consuming. Thus, for many players China remained the most viable large-scale seller, maintaining its overall dominance with a 72% share of the market (Figure 11). Nevertheless, China's market share did decline from 2008.

"...the total value of the primary CDM market in 2009 fell to US$2.7 billion, 59% less than the US$6.5 billion transacted in 2008."

[74] HSBC has measured the return of global climate-related investments through its Global Climate Change Index, designed to track and reflect the stock market performance of companies it believes are best placed to profit from a changing climate. Based on the return of those investments since September 2009 and more specifically, due to the poor behavior of the stocks classified as Carbon Trading-related in the same period, in March 2010, the Institution informed that "Carbon Trading no longer meets the minimum market capitalization criteria [of US$400 million] for inclusion in the HSBC Climate Change Index". HSBC, *Climate Change – March 2010 quarterly index review: Carbon Trading loses out post-Copenhagen*, March 16, 2010.

FIGURE 11
Primary CDM sellers[75]
Source: World Bank

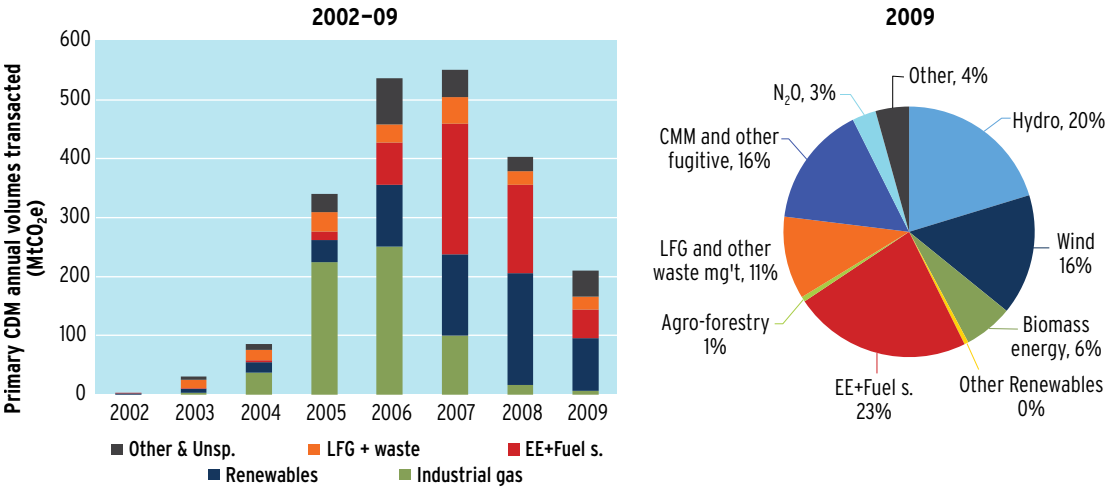


With the exhaustion of the low-hanging-fruit projects in early-mover regions and the difficult business environment in others, regions that previously had been largely bypassed by the scheme saw their long-term efforts begin to pay off. Africa and Central Asia doubled their market shares in 2009 to 7% (15 million tons) and 5% (10 million tons), respectively.

Preferred seller sectors (i.e., the sectors with the largest volumes under contract) were, indeed, the sectors that did not manage to secure all their sales previously. With the low-hanging fruit, namely industrial gases, quickly becoming exhausted, buyers were forced to choose from the best of the remaining sectors. Renewable energy and energy efficiency sectors gained market share, with 43% and 23%, respectively (clean energy thus accounted for two-thirds of 2009's primary market), although volumes declined (Figure 12).

With an eye on the EU ETS, private sector buyers purchased the largest portion of both CDM and JI projects (Figure 13), which totaled 237 million tons in 2009.[76] Given the fact that most financial players in the ETS operate in the United Kingdom, regardless of their actual nationality, the country appears to be the largest buyer with

FIGURE 12
Primary CDM sectors[77]
Source: World Bank



[75] Based on volumes purchased through 2012.
[76] One single utility firm in Europe reportedly holds over 15% of all (about 400 million tons) issued CERs.
[77] Based on volumes purchased through 2012.

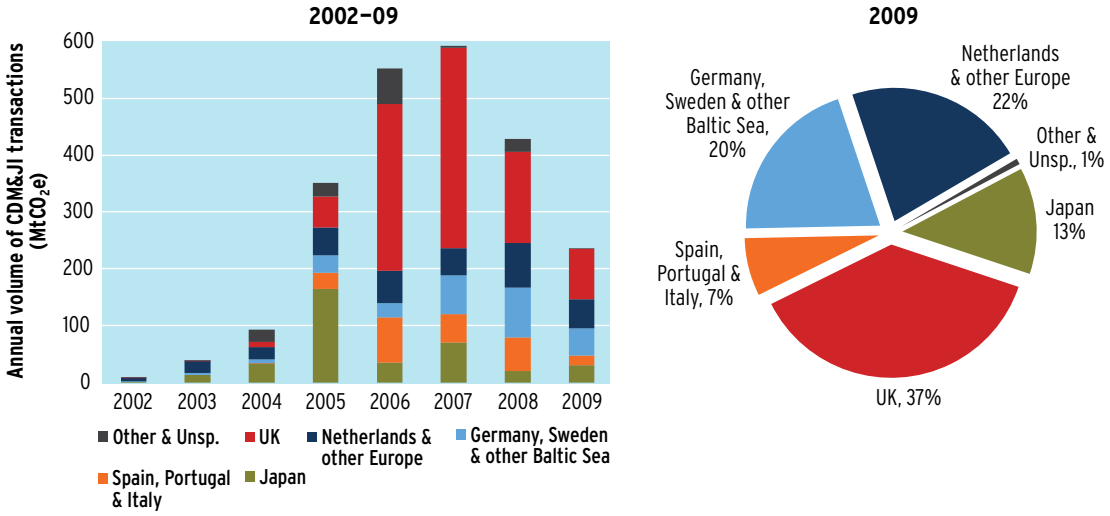


FIGURE 13
Primary CDM & JI buyers[78]

Source: World Bank

a nearly 40% share of volumes purchased. However, in reality those assets pass on to end users throughout Europe.

4.2.3 Projects wanted

As already discussed, the flow of private capital to developing regions began to fall substantially in the second half of 2008. Capital inflow reached US$1.16 trillion in 2007 only to fall sharply by 39% to US$707 billion in 2008. Private capital is estimated to have fallen another 49% to US$360 billion in 2009 (a 222% decrease from 2007 to 2009).[79] A cascade effect applies at a country level to investments in riskier sectors, which include underlying CDM and JI sustainable energy projects (for further information, see Section 4.3).[80]

Uncertainty over the future demand for carbon and the lack of access to finance has resulted in a considerable reduction in the number of CDM projects entering the pipeline.

The monthly average number of new CDM projects increased consistently from 2005 to 2008, reaching an average of 116 per month during the first 10 months of 2008 (see Figure 14).[81] From that high, however, the number subsequently fell by 10% through February 2010.[82] Figure 14 shows the reduced flow of new CDM projects into the pipeline. The high level of uncertainty regarding a post-2012 framework, CDM eligibility restrictions in ETS Phase III, long delays and high

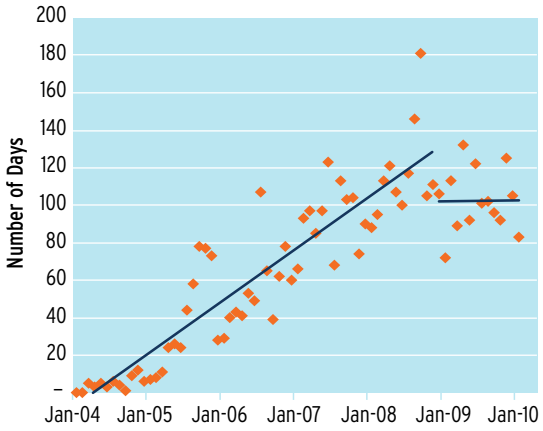


FIGURE 14
Number of projects entering the CDM pipeline each month, Jan. 04–Feb. 10

Source: UNEP Risoe and World Bank

[78] Based on volumes purchased through 2012. Purchases by the World Bank-managed family of funds have been attributed to the fund participants' countries at a pro rata basis. "Netherlands & other Europe" includes Ireland, France, Switzerland, Austria, and Greece; "Germany, Sweden & Baltic Sea" also includes Finland, Norway, Denmark, and Iceland; "Others" includes the United States, Canada, Australia, and New Zealand; "Unsp[ecified]" refers to purchases where we could not verify the origin of the buyer.

[79] World Bank, 2009, *Global Development Finance*.

[80] When access to capital becomes limited riskier sectors traditionally suffer the most. Data show that the share of those resources directed towards developing regions has historically been less than a third of total investment (UNEP, SEFI, New Energy Finance, 2009).

[81] The monthly average number of new projects increased from 36 in 2005, to 53 in 2006, to 90 in 2007.

[82] UNEP Risoe, *CDM/JI Pipeline Analysis and Database*, March 1, 2010.

FIGURE 15
Average time (days) necessary for projects to reach registration

Source: UNEP Risoe and World Bank

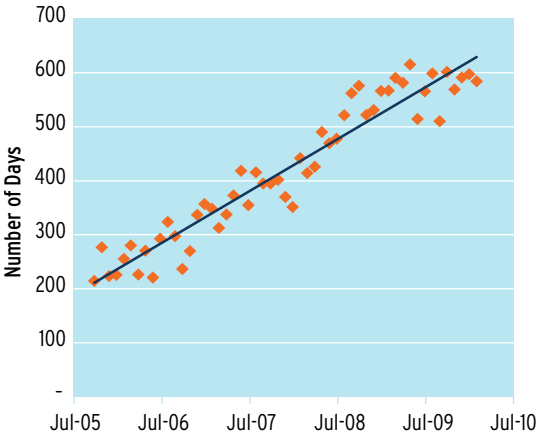
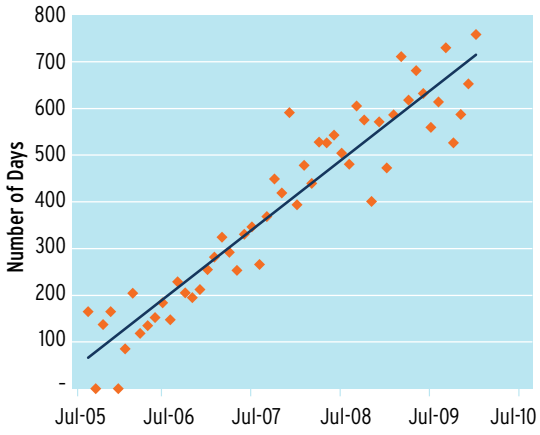


FIGURE 16
Average time (days) necessary for projects to move from registration to first issuance

Source: UNEP Risoe and World Bank



transaction costs have clearly contributed to the decline in the number of projects.

4.2.4 A close-up on issuance time

When evaluating delays in the asset creation process, the most common type of analysis looks at the time needed to develop a project from its earliest stages up to issuance.

However, this practice can mask some important findings. It overemphasizes the regulatory delays that chronically impact projects, while it underestimates the substantial impact of operational constraints after registration (e.g., financial closure, project commissioning and operations).

While in 2007 the average project needed 316 days to move from registration to first issuance, that time lengthened to 505 days in 2008 and to 607 days in 2009, for a total increase of 92% over two years (Figure 16).[83]

During the same period, the time required for projects to reach registration rose significantly less, from 373 days in 2007 to 572 days in 2009,[84] an increase of 53%. Figure 15 shows the average time needed to develop a project from start to registration and from registration to issuance.

4.3 THE RELEVANCE OF CARBON FINANCE IN THE TRANSITION TO A LOW-CARBON ECONOMY

The Clean Development Mechanism has been an important catalyst of low-carbon investment in developing countries. By complementing and leveraging other resources, it catalyzed the shift of much larger amounts of (essentially private) financial and investment flows toward climate-smart development. During 2002–08, about 1.9 billion CERs worth US$23 billion were contracted forward from projects that, if all implemented, would require US$106 billion in low-carbon investment, primarily in clean energy (see Figure 17).[85] In comparison, sustainable energy investment in developing countries totaled approximately US$80–90 billion over the same

[83] The analysis could also be impacted if the number of projects from different technologies issuing CERs would have dramatically changed over the years (i.e., as the issuance time can vary per technology, notably large projects that may request issuance more than once per year). Thus, to avoid misinterpreting the data, the authors confirmed that the proportion of first issuance requests per technology has not significantly changed, thus not impacting the confidence of the analysis.

[84] The time does not include the time required to develop the PDDs, which varies according to the nature of projects and can reach several months depending on the availability of consultants.

[85] More generally it is estimated that active projects that entered the CDM pipeline during 2002–09 could represent, should they all materialize, an investment of more than US$150 billion (two-thirds of which is in renewable energy, equally led by hydro- and wind power). Source: UNEP Risoe, *CDM/JI Pipeline Analysis and Database*, March 1, 2010.

period.[86] Additional revenues from carbon finance enhance the overall financial viability of low-carbon projects. As performance-based payments, these revenues create a positive incentive for good management and operational practices that will sustain emission reductions over time.

4.3.1 Investment barriers can be disproportionately large[87]

Despite these impressive numbers, most developing countries face significant investment barriers that limit the transformational impact of carbon finance. Consequently, where investment barriers have been relatively low CDM projects have been most successful.

Securing sources of funding—both equity and debt finance—sufficient to meet investment capital needs has proven to be a major constraint in advancing most CDM projects. Long-term finance from local financial institutions is inadequate and often costly. Even for qualified entrepreneurs, the high cost and stringent commercial conditions[88] of loans frequently do not match project needs and often become unsustainable. Access to international funding is an even greater challenge, particularly for the poorest countries where risky business environments and economic instability discourage private sector investment.

In addition to the overall investment barriers faced by all businesses, capital-intensive investments with modest Internal Rates of Return (IRRs) and long pay-back periods, as well as sectors exposed to currency risk[89] such as clean energy, face even greater financing constraints. In 2008, investment in sustainable energy in developing countries reached US$36.6 billion, or 31% of the US$118.9 billion in global investment in the sector. Africa received less than 1% of these resources.[90] In the same year, Brazil accounted for 88% of the total investment in South America, while China and India jointly accounted for 80% of investment in Asia and Oceania. The strong concentration of investment in the wealthiest nations within developing regions confirms the presence of disproportionately high and skewed barriers faced by the poorest countries. Unsurprisingly, the uneven geographic distribution of CDM mirrors these investment patterns, albeit on a much smaller scale.

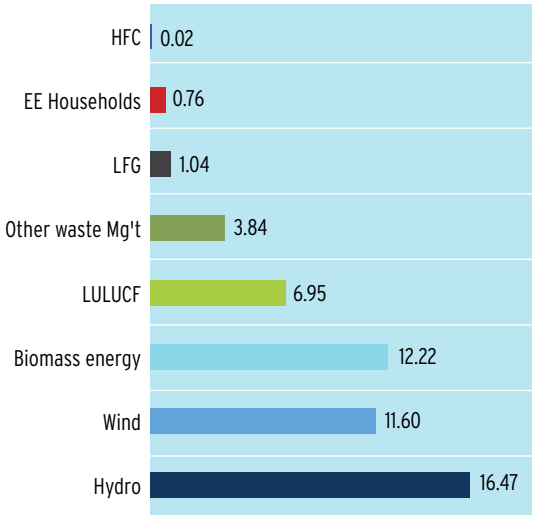


FIGURE 17
Ratio of investment to net present value of ERPA in the World Bank CDM portfolio[91]

Source: World Bank.

4.3.2 CDM cannot overcome all investment barriers

Carbon revenue streams are based on the volume of credits generated, the length of the purchase agreement and the carbon price. However, the impact of carbon finance is not the same across the spectrum of technologies. In some sectors, the CDM contri-

[86] Source: after UNEP, SEFI, New Energy Finance, *Global Trends in Sustainable Energy Investment 2009*. Estimates of clean energy investments that benefit from CDM tend to be higher than actual sustainable energy investment in developing countries since many CDM projects are neither operational, nor commissioned nor even at financial closure when CERs are transacted.
[87] Source: Kossoy, 2010, Managing Expectations, *Trading Carbon*, February 2010, Point Carbon
[88] Including high interest rates and fees, short tenors, strong guarantee and collateral requirements, and stringent covenants.
[89] Sectors that produce and sell goods in domestic markets and/or are unlinked to hard currencies.
[90] Source: UNEP, SEFI, New Energy Finance, *Global Trends in Sustainable Energy Investment 2009*.
[91] The nominal value of the ERPA is discounted at 10% per year, assuming all future payments occur in a period of five years.

bution to an underlying project's cash flow can be constrained by external factors beyond its control, ranging from policies and regulations to operations.

For example, in the case of clean energy projects the volume of credits can be particularly low in countries with clean energy grids. Additionally, the length of purchase agreements has been largely constrained by uncertainties related to the extent and design of any future regime. Finally, carbon pricing signals are, once again, linked to the level of ambition from policy makers[92] and delivery risk (e.g., lower prices for new technologies and less commercially attractive projects). Thus, low volumes, short contracts and low prices prevent carbon from substantially improving the economics of clean technologies.

The incremental IRR from future carbon revenues in renewable energy projects, taking the World Bank's projects as an example, is quite low (see Figure 18).[93] Thus, as very few renewable energy projects have IRRs higher than 10–11% without carbon, an incremental IRR of 1–2% from carbon would be insufficient to promote a technology switch since fossil-fuel alternatives would, in most cases, still compare favorably on a cost basis. In the same portfolio of projects, the net present value of the future carbon revenue streams totaled 6.3% of the capital expenditures (CAPEX), which is substantial in many countries since it represents almost half of the initial 15% in equity commonly needed by project developers before securing the remaining 85%. But carbon revenue does little to help secure financial closure in the poorest countries, where unfavorable business environments make it much more difficult to bridge funding gaps.

FIGURE 18
Incremental IRR from carbon revenues in the World Bank CDM portfolio

Source: World Bank.

IRR - Carbon Revenues

ER Prices	Purchase period 5y	Purchase period 10y
Renewable Energy		Impact per Unit
$10.0	1.0%	1.7%	$ 6.3/MWh
$20.0	2.2%	3.6%	$ 12.7/MWh

Solid Waste		
	0.58 tCO_2e/tSW	0.93 tCO_2e/tSW
$10.0	52.3%	62.4%
$20.0	123.7%	128.6%

*tSW = ton solid waste

HFC_{23}		
$10.0	176.7%	177.4%
$20.0	270.0%	270.2%

*65% tax applied on carbon revenues

4.3.3 Frontloading future carbon revenues remains a challenge

Carbon finance does not naturally address capital investment needs as payment for credits usually occurs on delivery, once the project is operational. Although there have been some advance payments in the market (10–20% of the nominal ERPA value), financial institutions have made few attempts to monetize ERPA receivables. The first monetization was reported in 2001,[94] although it has rarely been replicated because of the relatively high inherent risk in underlying projects, carbon finance regulatory risks, and chronic market uncertainties. Although carbon prices have increased three- or four-fold since the early 2000s, ERPA tenors have shortened up to 6 fold in the same

[92] Major industrialized economies should be encouraged to increase the scope for offsets to achieve at lower costs more ambitious emission reduction targets, in line with the 25–40% reductions below 1990 levels that have been called for by the IPCC in the 2020 timeframe.

[93] Source: World Bank. Sensitivity analysis scenarios were based on the projections of the projects' cash flows in the World Bank's carbon funds. Only the investments leading to GHG emission reductions were considered.

[94] Source: Kossoy, 2006, *The Role of Carbon Finance in Project Development*. In the structure, Rabobank financed a pig-iron project in Brazil (Plantar). The nominal value of the ERPA contract between the World Bank (as trustee of the Prototype Carbon Fund) and the project sponsors (Plantar) was monetized and anticipated by Rabobank Brazil to Plantar (i.e., the latter was both the recipient of the loan provided by Rabobank and the seller of the emission reductions to the World Bank). The loan was structured to mirror the proceeds of the ERPA contract between the project developer and the World Bank. The hard-currency denominated proceeds of the ERPA (carbon offsets) and the loan's repayment to be made directly by the Word Bank (outside Brazil) allowed Rabobank to significantly reduce the capital reserves in the transaction and revert the benefit to the borrower, providing longer-term funding at below-market terms.

period, reducing the overall value of ERPA contracts for monetization purposes.[95]

4.3.4 Leveraging carbon finance

All said, carbon revenues have not altered historical macro-economic development trends or overcome the sectoral and regional investment barriers faced by underlying projects. Carbon revenues have instead made relatively low-risk investments in proven technologies with marginal rates of return more attractive and profitable, enhancing their chances of being developed and remaining operational.

A number of actions can help maximize the transformational impact of carbon finance and mobilize both climate and development finance. In tackling the most prominent constraints and supporting low-carbon development at scale, the following actions can ultimately make carbon finance better fit into public and private sector investment decision-making:

(i) **scale up:** expand the demand side of the market by implementing more stringent emission reduction targets, and build a credible supply at scale by adopting a programmatic approach and moving toward large-scale sectoral and policy-based mechanisms;
(ii) **provide long-term predictability:** enable lengthier contracts and provide long-term pricing signals;
(iii) **develop comprehensive insurance/guarantee products:** underwrite political risks inherent in international negotiations and collective international actions, as well as the contract-frustration risk at country and sector levels. The combined efforts of multilateral development banks, international financial institutions and insurers/re-insurers might be required to create a sustainable business environment, enable the deployment of existing commercially unattractive low-carbon technologies and the development of new ones;
(iv) **use financial engineering to frontload future demand:** accelerate the transition to low-carbon investments (e.g., the issuance of bonds and monetization of future receivables);
(v) **wisely combine (blend) limited financial resources:** maximize the impact of investments related to climate change (e.g., the Global Environment Facility, the to-be-implemented Copenhagen Green Climate Fund, the Climate Investment Funds, revenues from project-based emission offsets, etc.) and foster additional private sector investment.

4.4 POST-2012 MARKET: "EU ETS CERs" SURGE AS A NEW ASSET

A glimpse of good news came in 2009 as the post-2012 market finally emerged, although it remains thin. A small number of firm deals materialized that went beyond the right of first refusal clauses seen in the ERPAs signed through 2008.[96] Indian sellers, who historically have opted for unilateral asset creation in their pre-2012 vintages, reportedly started selling forward their post-2012 CERs. While most contracts were reportedly signed for a few years only (usually no longer than the end of the projects' first crediting period), a handful of deals extended until the end of the third phase of the EU ETS in 2020.

Nevertheless, prices and commercial conditions reflected the lack of post-2012 clarity and references. A spectrum of pricing formulas emerged, ranging from fully fixed to fully variable, as buyers and sellers tested numerous trade strategies and accommodated varying risk profiles. Post-2012 assets were contracted at a €2–3 discount over pre-2012 assets. Fixed prices generally ranged from €6–8, although in a limited number of cases prices ranged as low as €4, or as high as €9.

[95] ERPA lengths in the primary CDM market have shortened with the proximity to the end of the Kyoto's first commitment period in 2012.
[96] Right of first refusal refers to the buyers' right to purchase vintages under contract at their own discretion.

> Ironically, the economic downturn and delays in CER issuance that have hindered the project-based market may ultimately end up being good news for post-2012 demand.

Variable pricing formulas were also seen, which normally established a fixed floor price and shared upside between buyers and sellers. In most contracts, future prices will be determined by the prevailing BlueNext spot CER prices or ECX front contract prices at the time of delivery with a certain discount based on a project's stage of development at the ERPA signature. Discounts ranged from 20% to 30% for projects at the validation stage, and from 10% to 20% for projects at the back of validation or at registration. Only sporadic links to EUAs (i.e., pCER prices equivalent to about 60% of the EUA prices) have been reported.

Given current restrictions on the import of offsets into Phase III of the EU ETS (please refer to Section 2.6.1 for further details) and the uncertainty surrounding the eligibility of certain sectors and countries, EU installations have sought contractual clauses that exempt them from purchasing the assets at delivery if those assets prove ineligible under the European Scheme, thereby passing eligibility risk to the seller. Buyers perceive eligibility risk as particularly relevant to projects in the most industrialized economies and in non-Annex I OECD countries (i.e., Brazil, South Africa, India, and China—aka BASIC, Mexico, and South Korea)[97] as well as to projects that involve industrial gases. The practices of layering and syndicating deals, and of purchasing and/or brokering project assets on a tentative basis, have also been used to mitigate post-2012 ETS eligibility risk.

Although the EU ETS is more than ever the engine that drives primary offset deals, some buyers have begun to include broader eligibility clauses in their contracts in preparation for potential future carbon regulation in the United States and Australia.

4.4.1 A silver lining

Ironically, the economic downturn and delays in CER issuance that have hindered the project-based market may ultimately end up being good news for post-2012 demand. These factors will lead EU installations to use fewer CERs and ERUs than the 1,400 $MtCO_2e$ limit during Phase II of the ETS. Thus, as long as the price of offsets remains lower than that of EUAs, the short Phase III, combined with the increased limit for offsets, should encourage EU installations to exhaust their import limits and thus sustain some demand. Under this scenario sound upcoming projects and programs, primarily in emerging regions and sectors, will probably be able to transact their assets. Competition for eligible primary CERs should also prevent their prices from falling in the coming years.

4.5 SCALING UP WITH PROGRAMMES OF ACTIVITIES

Strategically aggregated programs could become good vehicles to scale up mitigation efforts. Successful approaches will include a combination of policy-based and technological interventions, and will require capacity building to assess opportunities and develop necessary infrastructure.

4.5.1 Evolution of PoAs

The concept of Programmes of Activities (PoAs) was developed in response to calls to simplify project preparation and registration procedures and expand the scale of CDM project activities. The CDM EB launched its first call for public inputs on definition of policy and PoAs in May 2006[98] and published the guidelines in July

[97] Chile has been recently included in the group of OECD countries.
[98] EB 28, Annex 15
[99] EB 32, Annex 38 and 39

2007.[99] The first set of guidance on PoA procedures raised several regulatory, methodological and program design issues and resulted in serious concerns that PoAs would be dead on arrival. In response, through a public input process, the PoA rules were comprehensively revised in May 2009. While the new procedures address the majority of the barriers to development of PoAs, a few key issues such as the liability clause continue to linger.

4.5.2 Status and analysis

In early discussions, programmatic CDM was perceived primarily as a tool for promoting CDM in less-developed regions, in particular for widely dispersed micro-scale activities and for demand-side energy efficiency or renewable energy activities. This was reflected in the fact that a majority of the PoAs developed in the first year focused on distribution of cook-stoves, efficient light-bulbs, biogas plants, and solar water heaters. Supply-side activities were fewer and further between, with two large-scale hydropower PoAs and three PoAs to improve energy efficiency in distribution systems. The transport sector will receive a significant boost from the programmatic approach, however complex methodologies, multipart institutions, and modest emission reduction volumes continue to limit the development of PoAs in this sector. Forestry is another sector that lends itself well to this approach. However, issues similar to those in the transport sector continue to hinder the development of PoAs. As of March 24, 2010, 42 PoAs were published on the UNFCCC website, out of which 3 were registered and the remaining were in validation.

4.5.3 And finally

The programmatic approach could enable scaling up of mitigation efforts. However, this scale-up would continue to depend on regulatory signals and the ability of the CDM EB and the DOEs to assess and ensure environmental integrity without requiring excessive cost and effort. Simplification of methodological requirements and assessment of additionality would have the strongest impact on the ability of stakeholders to develop and implement PoAs. It is too early to derive lessons from the implementation of the CDM programmatic approach. It is clear, however, that programmes, even within the same sector and using the same technology, are very different as they need to be modified to suit country specific circumstances, the capacity and mandate of the coordinating entity, and the appropriate incentive mechanism.

Practitioners need to move from a narrow approach that measures each ton of GHG emission reductions to a holistic approach that estimates, with appropriate justification and confidence, the total GHG impact of a PoA. This will encourage the involvement of more stakeholders and support the scaling-up of sector, sub-sector, and system-wide emission reduction efforts.

4.6 MOVING AHEAD WITH CDM

Complex and evolving regulations, regulatory inefficiencies, and capacity bottlenecks have caused delays that have a negative financial impact on projects. It now takes an average of 572 days for a CDM project to go through validation and registration and another 607 days until first issuance (i.e., over three years in total). Delays and uncertainties lead to higher transaction costs, declining CER volumes, and lower market values. These issues penalize LDCs in particular by making it harder for them to access the carbon market and threaten to erode project sponsors' interest in carbon finance mechanisms over the long term.

Market players have not yet agreed on how to address the major constraints in the CDM market. We provide two different views on this topic in Box 7. As the international community works on effective and practical solutions to mitigate GHGs on a large scale, it is imperative that it makes full use of accumulated experience, knowledge, and

BOX 7 Two points of view on CDM reform

Kindly provided by Lex de Jonge of the Netherlands' Ministry of Environment, who is closely involved in the CDM regulatory process, and by Imtiaz Ahmad of Morgan Stanley.

Lex de Jonge,[1] Head of CDM Unit, Netherlands' Ministry of Environment

The CDM has developed over time into a massive success, much bigger than expected at the time it was conceived. Over 2,000 projects have been registered and an equivalent number or more are still in the pipeline. The flip side of this success has now also come to the surface: a multitude of delays in registration and issuance, in many cases starting with insufficient quality PDDs, followed by DOEs not catching all irregularities, which has resulted in a relatively high number of requests for reviews and reviews.

Add to all of this an over-burdened (because it is understaffed) support system, the UNFCCC Secretariat, and it is clear why many CDM participants have asked for reforms.

It is not an option for the Executive Board to be "easy" on the irregularities and low quality PDDs, since this would set uncontrollable precedents.

In recent years several measures have been taken to improve here: the development and release of the VVM (Validation and Verification Manual), a new set of criteria and procedures to accredit DOEs, new procedures which recognize that projects compared to their PDD may change over time, and the introduction of an enhanced completeness check, meant to catch irregularities even before submission of PDDs for registration, thereby reducing the number of requests for review. And the Board started to transparently present its compliance with self-imposed timelines, clearly showing that the volume of requests for registration, issuance, clarifications, revisions and deviations is only further increasing, which—apart from the frequently poor quality of submitted PDDs—is one of the reasons for the increasing delays.

In addition the CoP15 in Copenhagen instructed the Board to further streamline—and where possible shorten—its procedures and to introduce the possibility of appeals.

The initial results of the improvements are promising, as requests for review (registration) have been reduced from 70% to 60%. But much remains to be further improved here, bearing in mind that it is never acceptable to compromise the environmental integrity of the CDM.

Since 2006 the CDM regulatory system has been able to process 500 requests for registration per year. During 2009 up to now this number has increased to over 600 requests per year, thereby causing delays to increase. The Board is working hard to implement the CoP15 improvements, but if the volume of the inflow remains at the current high level it may take some time to reduce the delays.

Even more important, this experience shows that the actual system with all its (unfortunately necessary) checks and balances will never be able to cope with a volume of 1,000–2,000 yearly project submissions for registration in a post-2012 regime, irrespective of whether this would be under the Kyoto or another regime.

It seems obvious that we will need new approaches to address such volumes. The options here are standardized baselines and a more standardized assessment of additionality, which to a certain extent could only be efficient if applied on a larger scale than the actual project-by-project assessment required by the Kyoto rules.

Since mid 2009 the CDM has faced some other challenges as well, which many have referred to as "the Chinese wind projects". Let me emphasize that, though the entire discussion started with projects in China, the fundamental issues have nothing to do with this country. Those who would accuse the CDM Executive Board of discriminating against China are totally wrong. The real difficulty here is that at EB22 the Board adopted rules on how to deal with policies which existed before the adoption of the Kyoto Protocol (E+ policy) and after the adoption of the Marrakech Accords (E- policy); the basic philosophy here is that "low carbon policies" adopted after November 2001 are not held against CDM project developers. However, it has been unclear how to interpret changes in E- policies and in tariffs; this was simply not envisaged at EB22. Some even say a decrease in a tariff for renewables can be considered providing a comparative advantage for carbon intensive power production, which makes this change an E+ policy. Since the project developers and the DOEs were not able to explain and quantitatively substantiate how to interpret these tariff changes the problem is not yet resolved. As said, this is not about China. The Board has received signals about pressure in other major economies to modify the tariffs, which could

[1] Though Lex de Jonge was Chair of the CDM Executive Board during 2009 and is still a member now, the opinion in this article does not necessarily reflect the views of all Board members.

Two points of view on CDM reform *(continued)*

BOX 7

strongly affect the eligibility of power projects under the CDM. Perhaps ultimately here the way out could be a much broader approach than the project-by-project assessment only. We will learn in the time to come.

Imtiaz Ahmad, Executive Director, Morgan Stanley

The CDM has been successful in enabling the initial flow of capital into abatement projects around the world, and in creating a new mechanism that has led to the actual generation of emission reduction credits. The challenges facing the CDM now relate to scaling up the system, post-2012 uncertainty and regulatory continuity.

Private sector investors in abatement projects require regulatory certainty. Regulatory flux is not something that private sector investors are well equipped to deal with. If a given methodology has been successfully deployed in a particular host country and investors witness these projects successfully obtaining registration and generating credits then naturally this leads to others seeking to emulate the existing projects. This has been the case with wind projects in China over the last 4 years. For investors to suddenly find out that these projects have been successfully registered and implemented over a number of years yet now face additional scrutiny and barriers creates regulatory uncertainty.

A stable and predictable regulatory framework for the CDM mechanism is essential if additional private sector capital is to be deployed into abatement projects. The risk where this unravels is that investors question not only additional investments into the Chinese wind sector but also ask about other sectors within China and ask a next step question whether such barriers may be introduced in the future for investments in other geographical locations. The net effect of this is to reduce the deployment of new capital into CDM projects, in particular in the renewable energy sector at a time when power demand in parts of the developing world has been growing rapidly and, consequently, so have emissions from the underlying power sector.

Investors do recognize the need for environmental integrity and we do not wish to engage in projects that are not in line with the intent and rules of the system. However the rules need to provide clear and unambiguous direction as to what is and is not allowable. It may well be that the EB should adopt a benchmarking type system of approving projects using a particular methodology. Set the benchmark high, by all means, but ensure that it is clear and prescriptive in terms of eligibility for successful registration. Such a benchmark should be stable for a set period of time and then maybe the EB could review the benchmark after the predetermined timeline has expired, provide for the sake of argument a six month grace period for projects applying for registration using the same benchmark standard for registration and then, using the same methodology, determine for future projects whether or not the standard needs to be set higher or lower given existing experience.

The alternative of the current system is ambiguity and uncertainty, none of which bodes well for making the case in favor of the deployment of new investment into CDM projects.

Additional constraints in the system have related to the fact that the EU ETS may potentially introduce qualitative restrictions post 2012, pending the specific outcome of international negotiations and also the question mark of a new international agreement and whether, if such an agreement were achieved, it would continue the CDM.

These uncertainties have led to an ongoing reduction in new project activity as it takes around 2 years to get a new early stage project from Project Idea Note/feasibility study stage to a registered project, and then additional time before CERs actually get generated and issued.

Given the timelines entailed this means that we are already approaching a wall in terms of investing in and sponsoring new projects.

There is scope for the EU to announce what types of projects and geographies it would definitely allow (a positive list of CDM) in the event of a unilateral scenario where no international agreement is reached, even if at this stage the EU does not wish to produce the list of project methodologies and geographies that would be disallowed by the EU pending a unilateral scenario. A clear indication of at least a base case positive list would allow investors to know what they can deploy capital into with certainty.

In addition, whilst I am in favor of CDM being reformed and succeeding, at the same time it is important that politicians and regulators give due consideration to new mechanisms that can access established capital markets such, as bonds, and link them with carbon financing to enable the scaling up of financing made available and deployed into clean technology and GHG abatement post 2012.

> The solution to current challenges will certainly require a comprehensive approach in order to gain broad acceptance from all actors who have a stake in the success of the CDM market.

capacity.[100] The solution to current challenges will certainly require a comprehensive approach in order to gain broad acceptance from all actors who have a stake in the success of the CDM market.

4.7 JI: A MARKET MOVED BY ONE AUCTION AND ONE TENDER

Climex held a pilot ERU transaction of one thousand tons on September 30, 2009.[101] On January 8, 2010 BlueNext held its first ERU auction, selling 400,000 tCO_2e that came from three projects: two in Ukraine that involved coal-mine methane capture and the modernization of a steel mill, and one project in Hungary that mitigates landfill gas. The offsets represented almost 10% of all ERUs issued at the time and were sold at €11.21 per ton (i.e., €0.19 lower than the prevailing spot CER price of €11.40).

However, the biggest JI news was the Russian tender for project developers that was organized by state-owned Sberbank on February 17, 2010. The tender, which was opened to energy, industrial processes, agriculture, forestry, and waste projects only, was limited to 30 million ERUs. Yet it received 44 project proposals for 75 million ERUs by the time it closed on March 12. The winners might have to wait until early 2011 before the first issuance occurs.

The primary JI market transacted 26.5 million tons in 2009, slightly more than the 25.2 million tons transacted in 2008. ERU average prices fell by 8% to US$13.4 per ton, leading JI market value to decline to US$354 million from US$367 million in 2008. In 2009, ERUs traded at a €1–1.5 discount to CERs. However, our analysis found that a larger percentage of ERUs were traded at the tail end of the registration process, pulling average prices closer to the spot market and distorting asset-to-asset price comparisons.

So far, track two accounts for about 60% of the 368 visible projects[102] in the JI pipeline[103,104] and for 80% of ERU volume expected by 2012. However, only 16 track two projects have been registered so far, a disappointing completion rate of less than 10%. In comparison, there are 142 registered track one projects, almost 10 times the number in track two.

In light of this situation, buyers, who used to support projects that would be approved under the UN process to ensure environmental integrity,[105] have reportedly redirected their priorities towards delivery and are now much more inclined to accept ERUs from track one (Ukraine, which has proven its ability to issue LoAs, is a favored source). This is of particular relevance for EU compliance buyers who rely on having their JI projects registered and ERUs issued before December 2012 due to the EU ETS eligibility restrictions (please refer to Section 2.6.1 for details). So far, 12 projects have formally switched from track two to one, with seven of these projects located in Ukraine.[106]

---

[100] The World Bank is contributing to this effort by leveraging ten years of practical experience with carbon markets to provide insights and recommendations. Bosi et al., 2010, *Ten years of experience in carbon finance: Insights from working with Kyoto mechanisms*, World Bank, Washington, DC.
[101] According to Climex, the ERUs were transacted at a price of €11.95 each.
[102] We also understand that projects following the track one route will not necessarily become visible until approval from the host country is provided.
[103] http://ji.unfccc.int/JI_Projects/ProjectInfo.html (as of April 22, 2010)
[104] There are 33 track two projects that appear as withdrawn in the UNFCCC website. Those projects were kept in the overall count however, as most represented projects moving from track two to track one.
[105] Determination from the JI Supervisory Committee (Jisc).
[106] http://www.iges.or.jp/en/cdm/report_cdm.html#ji

4.8 AAUs: SOME GAINS AS OFFSETS SOUR

AAUs, which many players used to view primarily as a means to fill the gaps created by delays in the delivery of CERs and ERUs, enjoyed a captive market in 2009. Several countries made significant progress in implementing GIS schemes, thus attracting governments and Japanese companies that sought sizeable and predictable volumes at attractive prices (see Box 8).[107] The AAU market grew seven-fold to US$2.0 billion (€1.4 billion) on 155 million tons transacted, primarily through purchases by Japan from the Czech Republic and Ukraine.[108] While AAU transaction volumes increased substantially, CER and ERU volumes simultaneously declined sharply, thus corroborating the direct competition between those assets.

The increased demand somehow helped to sustain prices. While a few deals that lacked clear evidence of an attached GIS plan were confirmed at prices between €8–9 per ton, most deals were reportedly signed at €10. Following Copenhagen, and in light of the possibility that AAUs will no longer be acceptable for international trade beyond 2012, prices have declined.

In 2009 Ukraine developed an innovative climate finance structure that uses the country's largely untapped AAU reserves as collateral in JI projects established by state-owned Naftogaz. The projects aim to cut emissions of methane by patching holes in Ukraine's leaky gas networks. U.S.-based project developers agreed to perform the repairs on the condition that 20 million AAUs would be provided as collateral. Upon ERU delivery, AAUs are returned to the Ukrainian account.[109] Questions remain regarding the Ukrainian government intention to extend the scheme to other local projects seeking underlying finance as a tool to entice investors.

Similar schemes could be leveraged to ensure the development of many more environmentally sound GIS programs. Existing climate-funding resources could be used to finance GIS projects prior to the sale of the AAUs that would ultimately back them up. Proceeds from the future sale of AAUs would be used to replenish the resources used for the implementation of new projects or to support the long-term viability of established ones. These structures should ultimately attract additional buyers who fear reputational backfire for their goodwill compliance actions.

[107] Although there have been rumors that Japanese firms have explored arbitrage opportunities between previously acquired CERs and cheaper AAUs (with soft or no GIS plans attached), this practice seems unlikely to the authors. Disregarding reputational reasons, the fall in residual demand should discourage buyers from seeking lower prices to the detriment of environmental standards.
[108] The figures include one secondary transaction of 15 million tons, purchased by Japanese utilities from Slovakia.
[109] http://www.pointcarbon.com/news/1.1298854

BOX 8 GIS lessons learned and prospects for new mechanisms post 2012

In countries such as Latvia, the Czech Republic, and Poland the first batches of projects are being tendered, while in other countries implementation of GIS has faced delays or has been plagued with difficulties including alleged misuse of proceeds.[1] However, successful transactions demonstrated that GIS became a practical modality to strengthen the environmental integrity of AAU trading. Still, a longer history is required to fully assess merits of GIS. Experience so far shows that three elements are crucial for a successful GIS:

Good contracts

- AAU Purchase Agreements (AAUPAs) should specify and allocate greening obligations, MRV requirements, define eligible projects and their selection procedures, and specify what to do if greening defaults occurs (including sanctions). It should include the timeframes within which the AAU proceeds must be used for the agreed greening activities and intermediate milestones, which should be covenanted and monitored.

Good projects

- AAUPA should include criteria for the eligible greening programs to reach sectors that are not covered by the EU ETS or have transaction costs that are too high for JI;
- GIS provides sponsors that are not familiar with carbon finance with a good model for the design and implementation of programmatic approaches for small projects;
- The projects should contribute to the decarbonization of an economy, but be cost-effective and quickly implementable.

Good implementation and governance arrangements

- It is essential to appoint as GIS operators strong and autonomous institutions with experience in project finance;
- GIS can serve as a platform to integrate, combine and leverage funds from a variety of sources: dedicated public budgets such as environmental and energy efficiency funds, resources from international financial institutions and additional financial resources from the private sector;
- The proceeds from the sale of AAUs provide upfront payment for the implementation of GIS and can leverage investments more effectively than other carbon finance mechanisms;
- The participation of AAU buyers in designing GIS (e.g., technical assistance, governance) may facilitate the delivery of credibly greened AAUs;
- Critical elements of a successful GIS include: project design, transparent management, accounting and disbursement procedures for AAU proceeds (escrow accounts, treasury budget accounts, special fund accounts, etc.), financial products that use public resources appropriately and do not distort markets, and procedures for monitoring, reporting, and verification (MRV) of both environmental outcomes and financial flows.

Though emerging, experience with GIS could provide insights for scaling up of mechanisms and other mitigation efforts in the post-2012 era. For example, GIS experience may be useful for the realization of Nationally Appropriate Mitigation Actions (NAMAs) in terms of structuring priorities and project pipelines, benchmarking, sectoral and programmatic approaches, MRV practices and financial structuring (e.g. fundraising, developing blended grant-loan financial products, fund allocation, and traceability of the fund flows).

[1] In April 2010, Japan filed a complaint with Ukraine over the missing money it paid for the purchase of 30 million AAUs in 2009. Although Ukraine had pledged to invest the revenues in environmentally friendly projects, its recently elected president accused the previous administration of misusing the proceeds from the transaction and said the money has gone missing (Point Carbon, April 27, 2010).

SECTION 5

OUTLOOK

5.1 DEMAND AND SUPPLY BALANCE **Recent economic turmoil has led to a substantial decline in compliance needs over 2008–12 and a reduction in overall market activity. At the same time, the lack of long-term signals from regulators and policy makers has denied market players long-sought visibility, causing them to be more conservative.**

5.1.1 Government demand for Kyoto assets falls...

With emissions projections revised downward, the likely gross demand for Kyoto assets from industrialized Annex B governments has been adjusted to **475 $MtCO_2e$** through 2012, a decrease of 95 million tons from last year's estimate. EU-15 remains the chief source of demand, accounting for more than 70% of volume (see Table 4).

In 2008, EU-15 GHG emissions (excluding LULUCF) continued to decline, totaling approximately 3.98 billion tons (or 6.7% below the base year).[110] EU-15 members (and the EU as a whole) now expect to collectively meet, and possibly overachieve their Kyoto target. This outcome will rely on full implementation of all existing and additional policies and measures, particularly in sectors not included in the EU ETS, and on the use of the Kyoto Mechanisms (KMs) and carbon sinks as planned.[111] As emissions projections do not yet take into account the full impact of the global financial and economic crisis, compliance needs could be further eased.[112] EU-15 governments have announced their intention to use about 465 $MtCO_2e$ under the KMs over 2008–12, with Spain and Italy accounting for about half of these purchases, although total need could ultimately fall to **330–370 $MtCO_2e$**.[113] These governments have already contracted about 240 $MtCO_2e$ CERs and ERUs (nominal) and 40 million AAUs.

The EU is currently halfway to reaching its unilateral target of reducing emissions by 20% below 1990 levels in 2020. The implementation of additional planned measures could lower emissions to 14% below 1990 levels by 2020 while further measures, including flexibility mechanisms, will be required to bridge the remaining gap. However, in light of the great uncertainty surrounding a future climate regime, sovereign buyers have made fewer post-2012 purchases than could be expected from their likely demand over 2013–2020, which would be around 100 $MtCO_2e$ per year.

---

110 Source: UNFCCC, National Inventory Submissions 2010.

111 Source: European Environment Agency, 2009, *Greenhouse gas emission trends and projections in Europe 2009: Tracking progress towards Kyoto targets*.

112 Following 2009 projections reported by the European Environment Agency, about one-third of EU-15 countries could comply with their commitments under the EU Burden sharing agreement on the sole basis of existing policies and measures, while the remaining two-thirds could be short by about 700 million tons. Revised emissions projections now suggest that around half of EU-15 Member States could meet their target on the sole basis of existing policies and measures while the other half is short by about 540 million tons.

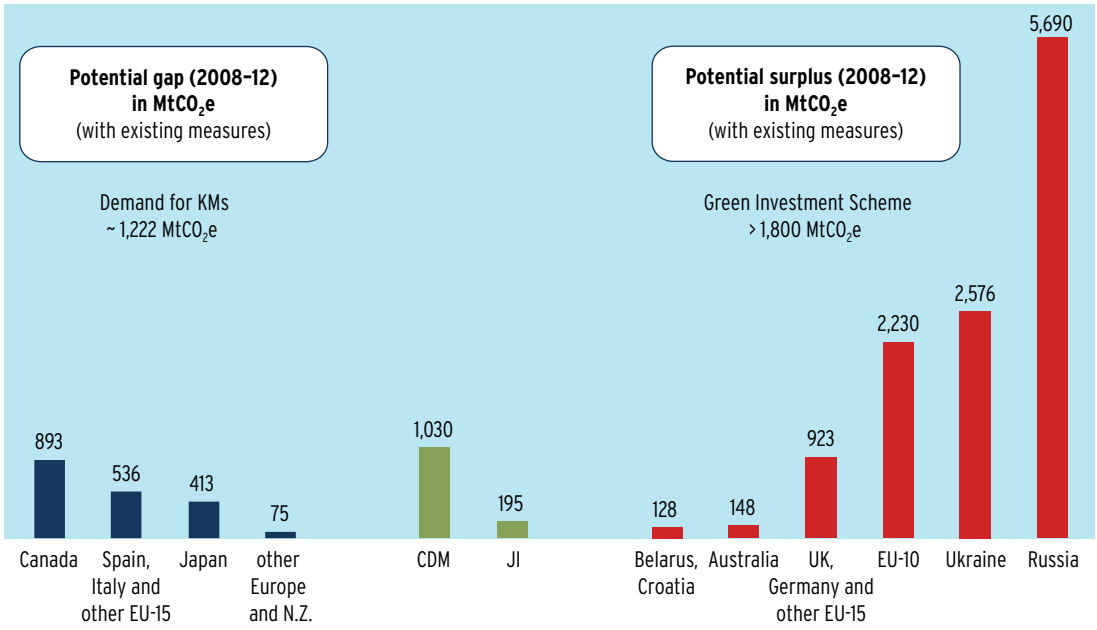
113 Depending on actual emissions levels and performance of policies and measures as well as removals by carbon sinks.

FIGURE 19
Shortfalls shrinking and length building-up[114]

Spain, Italy, and other EU-15 includes: Austria, Denmark, Ireland, Italy, Luxemburg, the Netherlands, Portugal, and Spain.

Other Europe and New Zealand includes: Iceland, Lichtenstein, Monaco, New Zealand, Norway, and Switzerland.

United Kingdom, Germany and other EU-15 includes: Belgium, Finland, France, Germany, Greece, Sweden, and the United Kingdom.



GHG emissions in Japan dropped by 6.4% in 2008 to 1,282 $MtCO_2e$ (slightly below 1990 levels) as the country was among the hardest hit by the global economic downturn.[115] Contracting energy demand, primarily from industry, was the main cause of declining emissions. While economic recovery is picking up and should further solidify next year, Japan nevertheless appears to be on track to comply with its Kyoto commitment, factoring in the use of KMs by both public and private entities (see Section 5.1.2) and the promotion of carbon sinks that will remove about 50 $MtCO_2e$ per year. At the end of March 2009, Japan's government announced that it had so far purchased 96 $MtCO_2e$ under the KMs, for the most part AAUs, nearing its **100 $MtCO_2e$** public procurement goal.

Public demand under the KMs in other Annex B countries should remain limited to about **25 $MtCO_2e$**. This is lower than announced in procurement plans as actual need may prove to be less than anticipated.

- Updated projections from H2'09 confirm that Australia should succeed in bridging its Kyoto gap solely through domestic policy and measures, in particular due to significant contributions from LULUCF activities.[116] Australia would meet its goal even without accounting for lower emissions due to slower economic growth.
- New Zealand's position under the Kyoto Protocol has improved vis a vis last year's estimates. The country now has an excess of about 11.4 $MtCO_2e$ over 2008–12, which is primarily attributable to lower emissions from agriculture and increased carbon removal by forests.[117]
- With the EU ETS a major instrument, Norway is well on the way to meeting its Kyoto

[114] Net positions under the existing measures scenario; does not include the effect of additional policies and measures, removals by carbon sinks and use of KMs. Projections based on Fifth National Communications, adjusted for revised economic outlook. Emissions projections have been revised using GDP forecasts by EC (*European Economic Forecast - autumn 2009*), World Bank (*Global Economic Prospects 2010: Crisis, Finance, and Growth*), and IMF (*World Economic Outlook Update*, January 2010) and assume an elasticity of emissions to GDP of 0.55 (average over 2005–08).

[115] Source: UNFCCC, National Inventory Submissions 2010. Japan's economic output contracted by 1.2% in 2008 and further by 5.2% in 2009. Source: *National Accounts of Japan* at www.esri.cao.go.jp/en/sna.

[116] See: Department of Climate Change and Energy Efficiency (2009). *Tracking to Kyoto and 2020: Australia's Greenhouse Emissions Trends 1990 to 2008–2012 and 2020.*

[117] See: New Zealand's net position under the Kyoto Protocol (updated: April 15, 2010). http://www.mfe.govt.nz/issues/climate/greenhouse-gas-emissions/net-position/index.html.

TABLE 4
Supply and demand in perspective — Kyoto market balance, 2008–12

Potential Demand from Industrialized Countries ($MtCO_2e$)		Potential Supplies ($MtCO_2e$)		
Country or entity	**Kyoto assets demand**			
EU	**890**	**Potential GIS**	**>1,800**[1]	
Government (EU-15)	350	Russian Federation	100	
Private sector (EU ETS)	540	Ukraine	400–500	
Japan	**300**	Eastern EU	1,325	
Government of Japan	100			
Japanese private sector	200			
Rest of Annex B	**32**	**CDM & JI**	**1,225**	**range: 1,155–1,290**
Government	25	CDM	1,030	975–1,085
Private sector	7	JI	195	180–205
TOTAL	**1,222**			
Government	475			
Private sector	747			

[1] These numbers correspond to the amounts of AAUs governments intend to sell (adapted from A. Tuerk *et al.*, 2010, *Green Investment Schemes: First experiences and lessons learned.* Working Paper, Joanneum Research, Austria). They are much lower than the whole amount of excess AAUs, now estimated at more than 10 billion tCO_2e over the first commitment period, with Russia accounting for half, Ukraine one-quarter, and Poland one-fifth.

target. In line with its long-term commitment to carbon neutrality (which includes an over-achievement of its Kyoto target), Norway plans to acquire about 27 $MtCO_2e$ under the KMs for use over 2008–12, of which about 12 $MtCO_2e$ had been contracted by the end of 2009. This could be more than enough to cover any liability under the Kyoto Protocol.

- Switzerland intends to take delivery of 10 $MtCO_2e$ from CDM and JI projects. However, the country will contract for slightly more than 12 $MtCO_2e$ to account for delivery risk. The Climate Cent Foundation, which is funded by a CHF1.5 cent per liter levy on gasoline and diesel imports, has been extremely active in the market and has already sourced 11.5 $MtCO_2e$.[118]

5.1.2 ...and so does private sector compliance demand

Demand from private entities is now estimated at **750 $MtCO_2e$**, down 30% from last year. The greatest drop has come from EU ETS operators (see Table 5).

The EU ETS is now expected to be long over Phase II, with an overall surplus on the order of 970 million tons to be banked, either in the form of allowances or unused offsets. This banking will ease the compliance challenges of installations during Phase III, although internal abatement efforts complemented by offsets will also be required.

Emissions from EU ETS installations dropped by more than 11% year-to-year in 2009 following the most severe contraction in industrial output in recent times. Although recovery has started, emissions will likely remain below the cap until the end of Phase II. Analysts estimate that this could lead to an average overall surplus of 300 million EUAs over 2008–12, comprising the unused portion of the new entrant reserve and other reserves, as well as excess allowances from industry. However, some installations, primarily utilities, are still short on allowances. They face an estimated compliance gap of 660 $MtCO_2e$ over 2008–12 to be filled by allowances and offsets, depending on availability and price.[119] Additional demand could

[118] Not all may be ultimately required to comply with the 8% below 1990 level target of Switzerland under the Kyoto Protocol.
[119] Source: Deutsche Bank. *The Generation Gap: How Many Phase-3 EUAs Are Needed by 2012?*, March 25, 2010.

TABLE 5
Analyst expectations for the EU ETS through 2020

	Projections for Phase II					Projections for Phase III (20% target)			
	position (+ short/ –long) ($MtCO_2e$)	CDM/JI ($MtCO_2e$)	banking ($MtCO_2e$)	sCER price (€/tCO_2e)	EUA price (€/tCO_2e)	position (+short/ –long) ($MtCO_2e$)	CDM/JI ($MtCO_2e$)	sCER price (€/tCO_2e)	EUA price (€/tCO_2e)
Barclays	–410	400	810	12–18	13.5–24	2,116[†]	1,000–1,400	20	35
Deutsche Bank	–225	750	975	n.a.	25[‡]	1,878	871	n.a.	48
Orbeo	–312	837[*]	1,004	15.9	18.8	2,829	916	n.a.	30.1

[†] net of expected reductions from CCS and energy efficiency policies.
[‡] by 2012.
[*] of which 472 million will be surrendered, including 145 million to cover compliance shortfall.

come from generators that start to hedge their future exposure in Phase III, when they will face tighter caps and increased auctioning.

European private sector entities, which have so far contracted about 1.5 billion tCO_2e (nominal), can decide to bank unused CERs and ERUs or surrender them and bank more EUAs to Phase III. The strategy that EU ETS operators choose will likely depend on the relative prices and availability of these assets, and on how quickly the uncertainty lifts over the rules that will govern the use of offsets beyond 2012. Estimates of CDM and JI demand over Phase II now range from 400 to 750 $MtCO_2e$ and average **540 $MtCO_2e$**, of which compliance needs may represent only a fraction.[120] This is much lower than the current supplementarity limit of about 1,400 million tons in Phase II and keeps intact a large portion of the supplementarity limit in effect over 2008–2020, estimated at 1,700 million tons. Although some banking of unused offsets will likely occur, this still leaves substantial future demand to be contracted.

Private sector companies in Japan have reportedly contracted more than 300 $MtCO_2e$ in CERs, ERUs, and AAUs that can be surrendered to comply with their targets under the Keidanren Voluntary Action Plan, a voluntary commitment by 34 industrial sectors to stabilize CO_2 emissions from energy production and use.[121] Among the main end-users, electric power companies have announced purchases of 250 $MtCO_2e$ (of which 64 $MtCO_2e$ were redeemed at the end of FY08) while iron and steel companies have contracted about 56 $MtCO_2e$. Overall, the private sector has purchased an estimated 54 million AAUs. No major additional contracting activity is expected from private companies, since the economic downturn has significantly reduced their compliance challenge (with demand revised downward to **200 $MtCO_2e$**) and legislation for a mandatory post-2012 ETS is at an early stage. However, a stronger than expected recovery, coupled with a lower utilization rate of nuclear power plants, could very quickly pull generators back to the carbon market.

[120] Société Générale estimates that only one-third of the 472 million CERs and ERUs surrendered by operators during Phase II corresponded to compliance needs. Of that third, 82 million tons were surrendered for compliance in 2008. Source: Société Générale. *Kyoto CO_2 market: increasing AAU length, decreasing market power of AAU sellers*, April 13, 2010.
[121] Reuters News, *Japan Steelmakers buy 3 million fewer CERs than expected in 2008–12*, November 17, 2009.
[122] In operation since 2008, the Swiss ETS covers those installations (around 350+) that took a binding commitment to reduce their emissions in lieu of paying a CO_2 tax on emissions from the use of fossil fuel. The tax is initially set at CHF12 (US$11 or €8) and could ramp up depending on emissions levels. In the event of non-compliance, the CO_2 tax is to be paid retroactively for each ton of CO_2 emitted since exemption was granted. To comply, installations can internally reduce emissions, trade allowances freely issued to them or acquire CERs or ERUs. So far the Swiss ETS has seen limited activity.

Exploratory demand from installations covered by the incipient NZ ETS, the Swiss ETS,[122] and other initiatives under development, such as Australia's CPRS, might reach **5–10 $MtCO_2e$** over 2008–12, depending on price levels and visibility beyond 2012.[123]

5.1.3 Supply through the three Kyoto mechanisms: CDM & JI down, AAU up

In recent years analysts have steadily revised downward their projections for CER supply, which now range from 0.97 to 1.09 billion CERs issued by 2012, or **1.03 billion CERs** on average.[124] Multiple factors have pushed supply down, including the smaller size of recent projects, reduced output from projects impacted by lower economic activity, growing delays along the project cycle resulting from capacity bottlenecks and procedural inefficiencies, the increasing difficulty in securing finance, and the lack of clarity on the post-2012 front. Many of these factors lowered the expected flow of new projects into the CDM pipeline and discouraged new investment. Delays and uncertainties lead to higher transaction costs, losses in CER volumes, and lower market values, potentially eroding the interest of project sponsors for project-based mechanisms over the long term.

JI has begun to deliver as an increasing number of projects have been determined and reached issuance. Over the past year the number of determined projects has more than tripled to 114, while the total number of issued ERUs now stands at 5.4 million, versus just 651,000 at the end of April 2009. Importantly, regulatory and institutional uncertainties are also being resolved in Russia, which has one of the largest JI potentials and represents a significant share of JI supply under contract. The first letters of approval for projects in Russia should soon be issued through a tender process, which includes only 30 million tons. All in all, analysts project that 180–205 million ERUs (average **195 million ERUs**) will be issued through 2012.

With buyers seeking sizeable and predictable volumes at attractive prices, the AAU market grew more than seven-fold in 2009 to US$2.0 billion (€1.5 billion) on 155 $MtCO_2e$ transacted. Several countries have made significant progress in implementing Green Investment Schemes (GIS), and the potential has grown to **1,800 million AAUs** (50% of the total comes from Ukraine and Poland), which is much larger than the anticipated demand. Uncertainties regarding the bankability of AAUs, which could play a decisive role in determining the commitment ambition of Parties under a future international climate change agreement, are likely to further reinforce this imbalance and negatively impact market dynamics.

5.1.4 A residual demand of 230 million tons

Expected gross use of KMs now stands at 1.22 billion tCO_2e over 2008–12, with approximately 61% of demand coming from the private sector. This is a 25% (410 million tons) decrease from last year's estimate, matched by a similar 30% (440 million tons) decline in the forecasts for pre-2013 CER and ERU supply, which coincidently now stands at the same 1.22 billion tCO_2e level (already adjusted for delivery risk). Although most Kyoto asset demand could be met in principle through CERs and to a lesser extent ERUs, AAUs will be needed to address the remaining shortfall, which could widen if deliveries from CDM and JI are lower than anticipated, if the performance of domestic policies and measures disappoints, or if economic recovery is stronger than expected.

[123] For instance, with a price cap at NZ$12.5 (approx. US$9 or €7) through 2012, NZ ETS installations today have only a limited appetite for CDM.

[124] Source: Barclays Capital. *Monthly Carbon Standard*, April 20, 2010: 1.09 billion CERs and 200 million ERUs over 2008–12; Société Générale. *Kyoto CO_2 market: increasing AAU length, decreasing market power of AAU sellers*, April 13, 2010: 974 million CERs and 205 million ERUs over 2008–12; UNEP Risoe CDM/JI Pipeline Analysis and Database, March 2009: 1.04 billion CERs and 180 million ERUs over 2008–12.

TABLE 6
Potential demand, contracted supply and residual demand, 2008–12

	Potential demand ($MtCO_2e$)	Contracted CERs and ERUs		AAUs ($MtCO_2e$)	Residual demand ($MtCO_2e$)
		nominal ($MtCO_2e$)	adjusted for performance ($MtCO_2e$)		
EU	**890**	**1,736**	**829**	**38**	**198**
Government (EU-15)	350	238	114	38	193
Private sector (EU-ETS)	540	1,498	715	0	0 (–175)
Japan	**300**	**372**	**177**	**125**	**12**
Government of Japan	100	34	16	72	12
Japanese private sector	200	338	161	54	0 (–15)
Rest of Annex B	**32**	**25**	**12**	**0**	**20**
Government	25	22	10	0	15
Private sector	7	3	1	0	6
Total	**1,222**	**2,133**	**1,018**	**163**	**231**
Government	475	294	140	110	225
Private sector	747	1,839	878	54	6

Note: Numbers may not add up due to rounding. A portion of the purchases attributed to the European private sector relates to portfolios of intermediaries that are available for secondary transactions. In addition to the volumes reported above, about 173 million tons (nominal) are contracted but not attributed, and are very likely in the hands of intermediaries. They could represent about 83 million tons also available for secondary transactions, with public or private entities.

About 2.17 billion CERs have been contracted over 2002–09 for pre-2013 delivery. We assume that all 2012 volumes from registered projects (nominal PDD values: 1.76 billion CERs) have been transacted by now[125] while the remainder (or 400 million CERs) comes from projects at validation or registration, transacted more recently. Registered projects are expected to deliver about one billion CERs pre-2013, a 57% delivery rate, while projects still at validation or registration have an anticipated delivery rate of 2%. This leads to an overall delivery factor for CDM of 47%. For JI, we directly apply the delivery rate from the UNEP Risoe pipeline, coincidentally also 47%.[126] All together, that leaves an estimated residual demand of 230 $MtCO_2e$ of Kyoto assets over the next three years, virtually all from European governments (see Table 6).

CDM projects contracted in the next few years will be unlikely to deliver large volumes before 2013, and thus governments may have to purchase AAUs to cover their residual Kyoto shortfalls and underdelivery of CDM and JI. Alternatively, as a number of CERs are in the hands of intermediaries (about 300 million), governments may also wish to secure some volumes through secondary transactions, with the advantage of being able to choose the type of projects generating them as is already the case under a number of procurement programs. The price and quality of assets will likely determine their compliance strategy. Some EU governments and EU ETS companies are already sourcing assets beyond 2012. However, with a lack of traction on the post-2012 front, origination activity could remain limited as growth in the pipeline of projects continues to slow.

5.2 MARKETS AND A POST-2012 INTERNATIONAL REGIME

Kindly provided by John Kilani, Director of the Sustainable Development Mechanisms programme in the UNFCCC secretariat.

While the UN Climate Change Conference in Copenhagen last December achieved much less than was hoped, its accomplishments on markets

[125] This comes to consider that un-contracted supply from unilateral projects will eventually reach the market. This volume is also accounted for in the analysis.
[126] UNEP Risoe CDM/JI Pipeline Analysis and Database, March 2009.

should not be dismissed. Copenhagen set down an ambitious work plan for the CDM, clarified options for scaling up the use of markets after 2012 and injected the Copenhagen Accord into the debate on the use of markets.

CDM reform was high on the agenda, as demonstrated by the annual report given by the CDM EB to the conference and the decision taken there on the CDM. Together, these documents establish a comprehensive work plan of strategic reforms aiming to improve the efficiency of the CDM process while maintaining its quality.

Key expectations include streamlining project procedures, allowing for appeals against the Board's rulings on projects, consolidating the Board's guidance, strengthening DOE performance, enhancing the objectivity of project baselines, and instituting loans for developing projects in countries under-represented in the CDM. These reforms complement well our own work to strengthen the secretariat's support of the Board and the CDM as a whole.

On wider issues in Copenhagen, as is well known, the conference showed a diversity of political interests in how an overarching climate regime should look in the future. In the end, there was more clarity on how various elements can be brought together and the conference extended the mandate of the negotiating groups to present their results to the next climate conference in December this year in Cancún, Mexico.

The specific role to be played by the market still needs clarifying. Those Parties rallying behind the "Copenhagen Accord" have declared their intent to pursue opportunities to use markets to enhance cost-effective mitigation actions and have also confirmed that private sources will contribute to the long-term financing goal of US$100 billion per year for developing countries.

Though these references may reflect an emerging consensus on markets, they are set against difficult discussions in the UNFCCC negotiating groups on the specific issue of markets over the last two years. The negotiations on further commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) have generally undertaken to keep CDM, JI and emissions trading going in the future, yet such references depend on agreement being reached on the legal form for capturing emission commitments beyond 2012. In resolving this larger issue, governments will also need to decide on other mechanisms issues on the table: should the CDM make more use of standardized baselines; can co-benefits be made to count for more when deciding on projects; should CCS, nuclear or other forestry activities be allowable?

Under the broad-ranging negotiations on long-term cooperative action under the Convention (AWG-LCA), the topic of markets has largely been left hanging while political focus has been directed to other issues that need to be resolved first. In particular, these issues have included emission reduction commitments and the public finance to be provided to developing countries.

What appears to be emerging is a recognition that the private sector cannot be neglected in any new international agreement that might be formulated. Market mechanisms can have a role in shifting private sector investments and other decisions from a browner path to a greener one. They can also make a substantial contribution to the delivery of support—finance, technology, and capacity-building—from developed to developing countries.

Several specific ideas have been raised. The best known seek to complement the CDM by establishing other market mechanisms that focus on larger scale, "aggregated" sources of emissions, such as crediting and trading approaches that target entire sectors of economies. Controversy remains however on how much developed countries should use credits generated by such instruments to offset their own domestic emissions.

2010 is a crucial year for the UN's market mechanisms, both for the CDM EB in implementing an ambitious reform agenda and for governments in overcoming the negotiating impasse to build on today's engagement of the private sector in cli-

mate action. Above all, the market needs certainty on its long-term direction in order to scale up its contribution. While markets are just one aspect of the complex balance sought by governments in their negotiations, recognition is growing that they must form an integral part of the international climate solution.

ANNEX I SUPPLEMENTARITY UNDER THE EU CLIMATE AND ENERGY PACKAGE

In accordance with the supplementarity principles enshrined in the Kyoto Protocol (i.e., "the acquisition of emission reduction units shall be supplemental to domestic actions for the purposes of meeting commitments…"),[127] the total import volume of credits in the EU ETS 20-20-20 scheme should equal 50% of the "reduction effort" over 2008–20, which corresponds to the difference between 2005 emissions and the caps in Phase II and Phase III, respectively.

For existing installations, the volume of credits from projects allowed in ETS Phases II and III combined will be equivalent to the greater of the volume of CERs and ERUs allowed during Phase II, or a specific percentage of Phase II allocation that will not be less than 11%. Operators with a limit higher than 11% in Phase II will keep the higher limit (e.g., Spain, Italy, etc). In addition, a higher limit is provided to operators classified as "most short in Phase II" (i.e., the entities with the lowest ratio between their allocation and 2005–07 emissions). This category includes entities such as power plants in Germany and the United Kingdom that have a smaller provision for offsets and already face auctioning. Using information included in National Allocation Plans for Phase II, this change could result in 150 $MtCO_2e$ of additional credits being allowed during the 2012–20 period (i.e., a total of 1,550 $MtCO_2e$), versus the 1,400 $MtCO_2e$ limit during 2008–12.

For new entrants and sectors, during Phase III the allowed volume of CERs and ERUs will be at least 4.5% (each) of annual verified emissions. CER and ERU volumes for the aviation sector will represent 1.5% of annual verified emissions.[128] All together, these three categories could create demand for another 150 $MtCO_2e$ worth of credits over Phase III (about 50 $MtCO_2e$ each). The Commission will determine the exact volume ceiling through a consultation process ("Comitology")[129] by the middle of 2010.

In summary, total demand for credits during 2008–20 should total 1,700 $MtCO_2e$,[130] based on the Phase II 1,400 $MtCO_2e$ limit, an additional

[127] http://unfccc.int/resource/docs/convkp/kpeng.html (Article 6.1 d)
[128] Over 3,000 operators will automatically become involved in the EU ETS from 2012 onwards. Operators had to start monitoring emissions from January 1, 2010. The current year's figures will define how many emissions rights each company will receive from the total number of certificates allocated to the sector, which is being forecast to account for around 10% of the entire ETS.
[129] Comitology is a simplified decision-making procedure within the EU. Decisions are taken by the Climate Change Committee, consisting of the European Commission and Member States officials. The European Parliament is consulted in the process. Point Carbon Use of CERs/ERUs in Phase 3: Questions and Answers, March 19, 2010.
[130] This number corresponds to an average supplementarity limit of about 6% or less than half of the average supplementarity limit of Phase II, which average 13.4% of allocation or about 280 $MtCO_2e$ per year (1,400 million tons/5-y).

150 $MtCO_2e$ from existing entities during Phase III, and 50 $MtCO_2e$ each from new sectors, new entrants and aviation during Phase III.[131]

Member States must also comply with the "effort sharing decision", which sets individual targets for sectors not included in the EU ETS (non-trading sectors). The annual credit limit for Member States is equal to 3% of 2005 emissions. In 12 of the member countries,[132] however, the limit is raised to 4% of 2005 emissions for credits generated from certain projects, with additional restrictions.[133] On average, this translates into a maximum demand of 700–800 $MtCO_2e$ over 2013–20 (about 90–100 $MtCO_2e$ annually). This is roughly comparable to the most recent estimates of annual demand for Kyoto assets from EU-15 governments under the burden-sharing agreement.

[131] According to Deutsche Bank (Carbon Emissions: Chapter & Verse: EU-ETS Rules for CER/ERU Use Beyond Copenhagen, November 16, 2009), the supplementary quotas will likely add 250–500 $MtCO_2e$, leading to a total CER/ERU demand of 1,640–1,890 $MtCO_2e$ from ETS installations in the 27 EU Member States over 2008–20.
[132] Austria, Finland, Denmark, Italy, Spain, Belgium, Luxembourg, Portugal, Ireland, Slovenia, Cyprus, and Sweden.
[133] Allowed credits can be sourced only in LDCs and Small Island States and are neither bankable nor transferable.

ANNEX II AUSTRALIA'S DIVISIVE CPRS[134]

Australia's CPRS legislation, which has been in the making for two years, has reached an impasse that appears likely to carry on for some time: plans for emissions trading in Australia have been recently postponed by the government to 2013.

Following a year of planning, draft legislation was introduced in March 2009 that initially aimed to start Australia's ETS on July 1, 2010. A number of changes were announced in May 2009 to accommodate concerns related to recovery from the global economic downturn. The changes included delaying by one year the start of the CPRS to July 1, 2011, setting a fixed price of AU$10 (US$9, €7) during the first year of operations and offering additional assistance to industry and power generators, essentially by increasing the scope for free allocation. Despite these revisions the Senate twice rejected the legislation.[135]

In February, following negotiations between the government and opposition in late 2009,[136] ETS legislation was introduced for the third time into Parliament (see Box 9), which included a number of additional amendments that focused on assistance to industry and households. The government, which championed the climate change effort, lacks a majority in Parliament's upper house. At the same time, public support for climate change legislation is on the wane following Copenhagen's mixed success in prompting international action.

As an interim measure to an effective emissions trading scheme the Green Party proposed levying a tax on carbon beginning this July, one year ahead of the scheduled start of the CPRS. Carbon would be taxed at AU$23 (US$21, €15) per tCO_2e, twice the fixed price in the legislation. The tax would rise to AU$24 (US$22, €16) in mid 2011.

Meanwhile, the opposition recently proposed a dramatically different approach that would involve the creation of a government fund that would stimulate voluntary domestic emissions reductions by targeting mitigation potential in soil carbon and renewable energy. Recent analysis questioned this approach's cost-effectiveness (as many low-cost abatement options could remain untapped under a voluntary approach), certainty (will activities deliver the expected volume of abatement?) and scalability (how might the grant-based approach trigger more significant changes once low-hanging fruit have been picked?). The

[134] This section benefited from written contribution kindly provided by Rodney Boyd, IDEAcarbon.
[135] Rudd's governing Labor Party holds a majority in the lower House of Representatives, which has so far passed the set of CPRS bills on three occasions without many difficulties. Conversely, in the Senate Labor is seven seats short of a majority, and gaining those seven votes needed to pass legislation has proven challenging. Resistance to the CPRS originates from two parties who are ideologically opposed to each other. Members of the opposition National-Liberal coalition and the Greens are both prepared to vote against the CPRS but for very different reasons. The Coalition believes the CPRS does not sufficiently protect industry, and characterizes the CPRS as a 'great big new tax'; the Greens say it does not do enough to make polluters pay.
[136] On December 1, 2009, the leadership of the Liberal-National Party coalition was challenged and was handed from Malcolm Turnbull, who worked to negotiate these amendments with the Government, to Tony Abbott, a fierce opponent to emissions trading. On December 2, 2009, the Senate voted against the CPRS Legislation for the second time.

BOX 9 Main features of the proposed Carbon Pollution Reduction Scheme (CPRS)[1]

The CPRS differs from the EU ETS in three major respects: it provides a much wider scope (including, in particular, fuels used for energy production and transport), a gateway system (or range) to announce future caps and unlimited supplementarity.

CPRS will have a comprehensive scope. The CPRS is expected to regulate approximately 75% of Australia's emissions (about 430 $MtCO_2e$ today, from around 1,000 mandated installations). GHGs included under the Kyoto Protocol from industrial processes, stationary energy, transport (upstream point of obligation), waste and fugitive emissions would be covered, but agricultural emissions would be excluded. Non-covered sources that count towards Australia's international commitment (i.e., reforestation, waste legacy) could opt-in through a baseline-and-credit mechanism (with Australia Emissions Units, AEUs, issued) while others (e.g., soil carbon) would be encouraged to access the voluntary carbon market.

The cap will be consistent with a mid-term commitment of reducing GHG emissions by at least 5% below 2000 levels by 2020. The long-term GHG reduction goal would be 60% below 2000 levels by 2050. Australia would scale-up its 2020 target to 25% below 2000 levels pending an ambitious global agreement (in line with stabilization at 450 ppm CO_2e), or to 15% within the context of a global agreement under which major developing economies would commit to substantially restrain emissions and advanced economies would adopt commitments comparable to Australia's. Following recent projections by Australia, GHG emissions (including LULUCF) would be about 20% above 2000 levels in 2020, implying that CPRS could well be short.[2] Caps would be set five years in advance with proposed ranges (or gateways) up to 10 years, an approach that would provide medium-term visibility while preserving flexibility to adjust the level of effort in light of scientific evidence, technological progress or international developments.

The majority of allowances will be auctioned, while there will be specific assistance provisions. Assistance will be in the form of free allocations for emissions-intensive trade-exposed Industries (EITEs), the coal sector (mining operations) and coal-fired electricity generators. About 70% of allowances would be auctioned at the outset of the scheme. The percentage would decrease to 55% as the proportion of allowances granted for free under assistance provisions is expected to increase. Proceeds from auctioning (about AU$16 billion over the first two years of the scheme, US$15 or €11 billion) would be spent domestically to assist households and businesses to adjust to the scheme and to invest in the transition to a low-carbon economy. Primary measures would include direct assistance to households (AU$50 billion over ten years) through tax benefits or cash transfer, a Climate Change Action Fund (AU$1.97 billion over seven years) that would target Small and Medium Enterprises (SMEs) or particularly impacted industries or regions, re-

analysis concluded that the CPRS would better address these three criteria.[137] Similarly, the *Strategic Review of Australian Government Climate Change Programs* (Wilkins Review)[138] emphasized the "disappointing" experience with grant programs to support GHG abatement via project-based mechanisms in Australia. The review highlighted difficulties in finding suitable projects, issues with transaction and operational costs and uncertainties regarding delivery.

With uncertainties mounting as to the future of a Federal ETS in Australia, the previously limited pre-compliance activity under the proposed CPRS has become non-existent. A state initiative intended to end on the commencement of the CPRS, the New South Wales GHG Reduction Scheme (NSW GGAS), will continue for at least for one more year. However, certificates under the NSW GGAS would not be eligible under a federal scheme. As a result, there has been a decline in the number of applications for accreditation by abatement certificate providers. The supply of GGAS certificates has also tightened following the launch of the Energy Savings Scheme (ESS)[139] in July. Ironically, this did not have much impact

[137] Seb Henbest, 2010, "The Coalition offer sits alternative to the CPRS, but it needs to come up with something better and get the numbers right", *Carbon Markets-Australia-Research Note*, Bloomberg New Energy Finance.
[138] Roger Wilkins AO, 2008, *The Strategic Review of Australian Government Climate Change Programs (Wilkins Review),* http://www.finance.gov.au/publications/strategic-reviews/docs/Introduction.pdf
[139] The Energy Savings Scheme (ESS), launched July 1, 2009 and to continue until 2020, is intended to progressively stimulate energy efficiency and lead to a 4% decrease in electricity sales. It targets energy retailers as well as parties such as

Main features of the proposed Carbon Pollution Reduction Scheme (CPRS) *(continued)* **BOX 9**

search and development assistance to sectors such as agriculture, and a Green Carbon Fund for ecosystems adaptation.

EITEs would receive a large share of the allowances needed to cover their liability for free. The number of allowances would be based on the carbon intensity of output (initially 66% or 94.5% of a 10% best practice carbon intensity benchmark, declining by 1.3% per year). Compensation to EITEs would also account for direct and indirect electricity and steam emissions costs from carbon regulation. The assistance program could be adapted later to reflect, among others, progress in reaching an international agreement or the existence of broadly similar carbon constraints internationally. The coal sector (mining) would also receive assistance during the first five years of the scheme, mostly through free allocations that would cover approximately 36% of the sector's annual liability. Coal-fired electricity generators would additionally receive assistance over ten years in the form of free allowances (around 15% of annual liability), although this assistance would be subject to a windfall review. Assistance could be cut in half during 2018–2021 if windfall profits appear likely.

During its first year, the CPRS would operate under a fixed price of AU$10 (US$9 or €7). The measure would be equivalent to a carbon tax. Full trading under the CPRS would commence in 2012–13, with a transitional price cap in place for four years, starting at AU$40 (US$37 or €27) and rising 5% per annum above inflation. The price cap would not exempt non-compliant entities from paying a penalty and of making good on their shortfall. Other cost control mechanisms would include unlimited banking, limited borrowing (to 5% of liability using units from the following year) and the unlimited use of international carbon units.

There would be unlimited imports of eligible international units. Eligibility would initially be restricted to Kyoto units, including CERs (except t/lCERs), ERUs, and RMUs. AAUs would not be included initially. Other carbon units could be made eligible in the context of linking with other schemes. So far however, the export of CPRS allowances is not allowed.

[1] As of early March 2010. For more information, see *Explanatory Memorandum* and for a recent analysis, O. Sartor, 2010, *Climate Change Policy in Australia: Towards a Cap-&-Trade Market for Greenhouse Gases*, Climate Report #19, CDC Climat Research.

[2] The cumulative shortfall from scheme inception to 2020 could range in-between 580–1,020 $MtCO_2e$, depending on the national target. Estimate obtained as the difference between CPRS caps and baseline emissions projections for regulated entities. Assumptions on the caps schedule follow the announcement by the government that CPRS caps would be calculated as the difference between the indicative national trajectory and the emissions projections from sources not covered by the scheme. CPRS shortfall could ultimately be lower depending on policies and measures implemented in non-CPRS sectors (which, absent additional intervention, remain flat in the baseline scenario). Source for baseline emissions: *Tracking to Kyoto and 2020: Australia's Greenhouse Emissions Trends 1990 to 2008–2012 and 2020.*

on the NSW GGAS market because supply has nevertheless remained at a comfortable level. In fact, total market value has declined further to an estimated AU$151 million (US$117 million or €84 million), two-thirds of last year's value.[140]

electricity generators in NSW. Participants can meet their obligations by surrendering energy savings certificates (ESCs). There has been an automatic transition for energy efficient projects under the NSW GGAS—though some activities (e.g., CFL) may no longer be eligible.

[140] These numbers correspond to movements of certificates in the registry. Futures contracts are thus not taken into account, leading to a potential under-estimation of market activity.

METHODOLOGY

Monitoring the activity of the primary project market is a challenging task given the number of transactions and the diversity of participants. In addition, prices and contract structures are confidential in an increasingly competitive market.

The authors have surveyed major carbon-industry publications[141] and conducted interviews with a broad range of market players: analysts and intelligence providers, project developers and aggregators, exchanges and trading platforms, financial institutions and brokers, regulators, managers of carbon purchasing funds and facilities, including public procurement programs and carbon portfolios of companies facing compliance obligations. This report focuses on regulatory compliance; therefore its coverage of the voluntary market is not exhaustive. The information on the voluntary market (including pre-compliance activity in North America) has been kindly provided by Bloomberg New Energy Finance and Ecosystem Marketplace.

Only signed ERPAs are included in the project-based transaction database and volumes are accounted for through 2012. Although the study received a high level of cooperation from market players, the authors were not able to obtain comprehensive information for all reported transactions. The authors are relatively confident that the database captures most transactions entered into by governments and a representative proportion of the activity of private sector buyers in the primary market. In between the periodic reports in this series, the authors have occasionally become aware of unrecorded transactions from previous years as well as of the cancelation or postponement of previously recorded transactions. Adjustments have been made in the database, explaining why data for former years may be slightly different from previous publications in this series.

Data for transactions on the so-called secondary CDM (& JI) market including spot transactions[142] and forward transactions with delivery guarantees from a creditworthy seller, were obtained from ex-

[141] Including online sources such as Carbon Finance (www.carbon-financeonline.com), Joint Implementation Quarterly (www.jiqweb.org), PointCarbon (www.pointcarbon.com) as well as Bloomberg New Energy Finance (www.newenergyfinance.com), Carbon Positive (www.carbonpositive.net), CDC Climat Research (www.cdcclimat.com), the Climate_L list (www.iisd.ca), IDEAcarbon (www.ideacarbon.com), Ecosystem Marketplace (www.ecosystemmarketplace.com) or Thomson Reuters, the CDM, and JI pipeline databases and analyses maintained by UNEP Risoe and IGES and websites of market players (DNAs, DOEs, project developers and aggregators, exchanges and trading platforms, financial institutions and brokers, regulators, carbon purchasing funds and facilities, public procurement programs, companies facing compliance obligations). One should also mention other resources, such as reports prepared by financial institutions, including analyses by Barclays Capital, Deutsche Bank, and Société Générale, that have been made kindly available to the authors.

[142] Some of these spot transactions relate to sales of issued CERs directly by project sponsors, either those who have chosen to develop their projects unilaterally or those who have been issued more CERs than they had sold through forward transactions. These spot transactions could be arguably considered to be primary transactions although commercial conditions including prices are aligned with the secondary market. It is not possible however to extract those from the broader secondary market activity.

changes and trading platforms.[143] This is also the case for transactions of EUAs and derivatives.[144] The authors have also obtained detailed information on transactions conducted under CCX and RGGI as well as aggregate information on transactions under the New South Wales Greenhouse Gas Reduction Scheme (NSW GGAS).[145] With regard to AAU transactions, several sources have been used and cross-checked: public announcements, interviews with some buyers and sellers as well as examination of Kyoto Parties' registries, when possible.

To estimate the volume of "pure" bilateral transactions of EUAs and CERs (i.e., those deals that are not closed through brokers or exchanges—including cleared OTC), the authors surveyed several market players. The answers vary depending on respondents (financials or naturals), with an average of 15% of volumes transacted or cleared through exchanges. Taking into account all inputs, this coefficient is applied to volumes and values of spot and forward transactions to compute the entire value of the EUA and secondary CER markets.

In consultation with several market players, the options market in this report was valued as total volumes times strike price, assuming that the bulk of transactions are at-the-money options where the strike price is similar to prevailing market prices.

Prices and values are primarily expressed in nominal US$ per tCO_2e, unless indicated otherwise.[146] An average annual exchange of €1 = US$1.39 for 2009 was applied, unless data were available with a finer granularity, in which case an average exchange rate over the period considered (e.g., Q1'09, June 2009) is applied. The cut-off date for information is April 30, 2010. A ton (abbreviated as "t") refers to a metric ton (1,000 kg).

[143] For 2009, such exchanges and trading platforms were: BlueNext, Climex, European Climate Exchange (ECX), European Energy Exchange (EEX), Green Exchange, London Energy Brokers Association (LEBA), Multi Commodity Exchange of India Ltd. (MCX), and Nord Pool.

[144] Data on EUA transactions in 2009 (Spot, Futures and Options) were obtained from the following sources: BlueNext, Climex, Energy Exchange Austria (EXAA), European Climate Exchange (ECX), European Energy Exchange (EEX), Italian Power Exchange (IPEX), Green Exchange, London Energy Brokers Association (LEBA), and Nord Pool.

[145] For RGGI, source is Chicago Climate Futures Exchange (CCFE); for NSW GGAS, data come from registry (volumes) as well as Ecosystem Marketplace (prices).

[146] Exchange rates from oanda.com

GLOSSARY

Accredited Independent Entity (AIE): Accredited independent entities (AIEs) are independent auditors that assess whether a potential project meets all the eligibility requirements of the JI (determination) and whether the project has achieved greenhouse gas emission reductions (verification).

Additionality: A project activity is additional if anthropogenic GHG emissions are lower than those that would have occurred in the absence of the project activity.

Afforestation: The process of establishing and growing forests on bare or cultivated land, which has not been forested in recent history.

Annex I (Parties): Annex I Parties include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.

Annex B (Parties): The 39 industrialized countries (including the European Economic Community) listed in Annex B to the Kyoto Protocol have committed to country-specific targets that collectively reduce their GHG emissions by at least 5.2% below 1990 levels on average over 2008–12.

Assigned Amount Unit (AAU): Annex I Parties are issued AAUs up to the level of their assigned amount, corresponding to the quantity of greenhouse gases they can release in accordance with the Kyoto Protocol (Art. 3), during the first commitment period of that protocol (2008–12). One AAU represents the right to emit one metric ton of carbon dioxide equivalent.

Backwardation: A downward sloping forward curve (i.e., the price of the future is less than the spot price of underlying commodity). Antonym: contango.

Banking or carry over: Compliance units under the various schemes to manage GHG emissions in existence may or may not be carried over from one commitment period to the next. Banking may encourage early action by mandated entities depending on their current situation and their anticipations of future carbon constraints. In addition banking brings market continuity. Banking between Phase I and Phase II of the EU ETS is not allowed but is allowed between Phase II and further Phases. Some restrictions on the amount of units that can be carried over may apply: for instance, EUAs may be banked with no restriction while the amount of CERs that can be carried over by a Kyoto Party is limited to 2.5% of the assigned amount of each Party.

Baseline: The emission of greenhouse gases that would occur without the policy intervention or project activity under consideration.

Biomass Fuel: Combustible fuel composed of a biological material, for example, wood or wood by-products, rice husks, or cow dung.

California Global Warming Solution Act AB32 (AB32): The passage of Assembly Bill 32 (California Global Warming Solution Act AB32) in August 2006 sets economy-wide GHG emissions targets as follows: Bring down emissions to 1990 levels by 2020 (considered to be at least a 25% reduction below business-as-usual) and to 80% of 1990 levels by 2050. Covering about 85% of GHG emissions, a cap and trade scheme (still under design) would be a major instrument, along with renewable energy standards, energy efficiency standards for buildings and appliances as well as vehicle emissions standards.

Cap and trade: Cap and trade schemes set a desired maximum ceiling for emissions (or cap) and let the market determine the price for keeping emissions within that cap. To comply with their emission targets at least cost, regulated entities can either opt for internal abatement measures or acquire of allowances or emission reductions in the carbon market, depending on the relative costs of these options.

Carbon Asset: The potential of greenhouse gas emission reductions that a project is able to generate and sell.

Carbon Finance: Resources provided to activities generating (or expected to generate) greenhouse gas (or carbon) emission reductions through the transaction of such emission reductions.

Carbon Dioxide Equivalent (CO_2e): The universal unit of measurement used to indicate the global warming potential of each of the six greenhouse gases regulated under the Kyoto Protocol. Carbon dioxide—a naturally occurring gas that is a byproduct of burning fossil fuels and biomass, land-use changes, and other industrial processes—is the reference gas against which the other greenhouse gases are measured, using their global warming potential.

Certified Emission Reductions (CERs): A unit of greenhouse gas emission reductions issued pursuant to the Clean Development Mechanism of the Kyoto Protocol, and measured in metric tons of carbon dioxide equivalent. One CER represents a reduction in greenhouse gas emissions of one metric ton of carbon dioxide equivalent.

Chicago Climate Exchange (CCX): Members to the Chicago Climate Exchange make a voluntary but legally binding commitment to reduce GHG emissions. By the end of Phase I (December, 2006), all Members will have reduced direct emissions 4% below a baseline period of 1998–2001. Phase II, which extends the CCX reduction program through 2010, will require all Members to ultimately reduce GHG emissions 6% below baseline. Among the members are companies from North America as well as municipalities or U.S. States or Universities. As new regional initiatives began to take shape in the U.S., membership of the CCX grew from 127 members in January 2006 to 237 members by the end of the year while new participants expressed their interest in familiarizing themselves with emissions trading.

Clean Development Mechanism (CDM): The mechanism provided by Article 12 of the Kyoto Protocol, designed to assist developing countries in achieving sustainable development by allowing entities from Annex I Parties to participate in low-carbon projects and obtain CERs in return.

Climate Action Reserve (CAR): The Climate Action Reserve is a U.S.-based offsets program that establishes regulatory-quality standards for the development, quantification, and verification of greenhouse gas (GHG) emissions reduction projects in North America; issues carbon offset credits known as Climate Reserve Tonnes (CRT) generated from such projects; and tracks the transaction of credits over time in a transparent, publicly-accessible system.

Community Independent Transaction Log (CITL): The Community Independent Transaction Log (CITL) conducts "supplementary checks" to those by the ITL for transactions involving registries of at least one EU Member State, such as the issuance, transfer, cancellation, retirement, and banking of EUAs.

Conference of Parties (COP): The supreme body of the Convention. It currently meets once a year to review the Convention's progress. The word "conference" is not used here in the sense of "meeting" but rather of "association," which explains the seemingly redundant expression "fourth session of the Conference of the Parties."

Conference of the Parties serving as the Meeting of the Parties (CMP): The Convention's supreme body is the COP, which serves as the meeting of the Parties to the Kyoto Protocol. The sessions of the COP and the CMP are held during the same period to reduce costs and improve coordination between the Convention and the Protocol.

Contango: A term used in the futures market to describe an upward sloping forward curve (i.e., futures prices are above spot prices). Antonym: backwardation.

Crediting period: The crediting period is the duration of time during which a registered, determined or approved project can generate emission reductions. For CDM projects, the crediting period can be of either seven years (renewable twice) or of ten years (non-renewable).

Designated Focal Point (DFP): Parties participating in the Joint Implementation (JI) mechanism are required to nominate a Designated Focal Point (DFP) for approving projects.

Designated National Authority (DNA): An office, ministry, or other official entity appointed by a Party to the Kyoto Protocol to review and give national approval to projects proposed under the Clean Development Mechanism.

Designated Operational Entities (DOEs): Designated operational entities are independent auditors that assess whether a potential project meets all the eligibility requirements of the CDM (validation) and whether the project has achieved greenhouse gas emission reductions (verification and certification).

Determination: Determination is the process of evaluation by an independent entity accredited by the host country (JI Track 1) or by the Joint Implementation Supervisory Committee (JI Track 2) of whether a project and the ensuing reductions of anthropogenic emissions by sources or enhancements of anthropogenic

removals by sinks meet all applicable requirements of Article 6 of the Kyoto Protocol and the JI guidelines.

Eligibility Requirements: There are six Eligibility Requirements for Participating in Emissions Trading (Art. 17) for Annex I Parties. Those are: (i) being a Party to the Kyoto Protocol, (ii) having calculated and recorded one's Assigned Amount, (iii) having in place a national system for inventory, (iv) having in place a national registry, (v) having submitted an annual inventory, and (vi) submit supplementary information on assigned amount. An Annex I party will automatically become eligible after 16 months have elapsed since the submission of its report on calculation of its assigned amount. Then, this Party and any entity having opened an account in the registry can participate in Emissions Trading. However, a Party could lose its eligibility if the Enforcement Branch of the Compliance Committee has determined the Party is non-compliant with the eligibility requirements.

Emission Reductions (ERs): The measurable reduction of release of greenhouse gases into the atmosphere from a specified activity, and a specified period of time.

Emission Reductions Purchase Agreement (ERPA): Agreement which governs the transaction of emission reductions.

Emission Reduction Units (ERUs): A unit of emission reductions issued pursuant to Joint Implementation. One EUA represents the right to emit one metric ton of carbon dioxide equivalent.

Emissions Trading Scheme (ETS): see cap and trade.

EU-10: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.

EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, United Kingdom.

European Union Allowances (EUAs): the allowances in use under the EU ETS. An EUA unit is equal to one metric ton of carbon dioxide equivalent.

European Union Emission Trading Scheme (EU ETS): The EU ETS was launched on January 1, 2005 as a cornerstone of EU climate policy towards its Kyoto commitment and beyond. Through the EU ETS, Member States allocate part of the efforts towards their Kyoto targets to private sector emission sources (mostly utilities). Over 2008–12, emissions from mandated installations (about 40% of EU emissions) are capped on average at 6% below 2005 levels. Participants can internally reduce emissions, purchase EUAs or acquire CERs and ERUs (within a 13.4% average limit of their allocation over 2008–12). The EU ETS will continue beyond 2012, with further cuts in emissions (by 21% below 2005 levels in 2020 or more, depending on progress in reaching an ambitious international agreement on climate change).

First Commitment Period: The five-year period, from 2008 to 2012, during which industrialized country have committed to collectively reduce their greenhouse gas (or "carbon") emissions by an average of 5.2% compared with 1990 emissions under the Kyoto Protocol.

Green Investment Scheme (GIS): A GIS is a voluntary mechanism through which proceeds from AAU transactions will contribute to contractually agreed environment- and climate- friendly projects and programs both by 2012 and beyond.

Greenhouse gases (GHGs): Both natural and anthropogenic, greenhouse gases trap heat in the Earth's atmosphere, causing the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and ozone (O_3) are the primary greenhouse gases. The emission of greenhouse gases through human activities (such as fossil fuel combustion or deforestation) and their accumulation in the atmosphere is responsible for an additional forcing, contributing to climate change. The Kyoto Protocol regulates six GHGs: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_20), as well as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Global Warming Potential (GWP): An index representing the combined effect of the differing times greenhouse gases remain in the atmosphere and their relative effectiveness in absorbing outgoing infrared radiation.

Internal rate of return: The annual return that would make the present value of future cash flows from an investment (including its residual market value) equal the current market price of the investment. In other words, the discount rate at which an investment has zero net present value.

International Transaction Log (ITL): the ITL links together the national registries and the CDM registry and is in charge of verifying the validity of transactions (issuance, transfer and acquisition between registries,

cancellation, expiration and replacement, retirement, and carry-over). It is the central piece of the emissions trading under the Kyoto Protocol.

Japan-Voluntary Emissions Trading Scheme (J-VETS): Under the J-VETS, companies receive subsidies to implement mitigation activities in line with voluntary commitments and can resort to emissions trading (incl. offsets) to meet their commitments with more flexibility. Though growing, impact remains limited: over the first three years of the scheme, participants (288 companies) have reduced their emissions by about one million tCO_2e. The J-VETS has contributed to the development of MRV system, third-party verification system, and the registry system. The J-VETS has been incorporated to the Experimental Integrated ETS as one of participating options.

Joint Implementation (JI): Mechanism provided by Article 6 of the Kyoto Protocol, whereby entities from Annex I Parties may participate in low-carbon projects in hosted in Annex I countries and obtain Emission Reduction Units in return.

Kyoto Mechanisms (KMs): the three flexibility mechanisms that may be used by Annex I Parties to the Kyoto Protocol to fulfill their commitments. Those are the Joint Implementation (JI, Art. 6), Clean Development Mechanism (CDM, Art. 12) and International Emissions Trading (Art. 17).

Kyoto Protocol: Adopted at the Third Conference of the Parties to the United Nations Convention on Climate Change held in Kyoto, Japan in December 1997, the Kyoto Protocol commits industrialized country signatories to collectively reduce their greenhouse gas emissions by at least 5.2% below 1990 levels on average over 2008–12 while developing countries can take no regret actions and participate voluntarily in emission reductions and removal activities through the CDM. The Kyoto Protocol entered into force in February 2005.

Monitoring Plan: A set of requirements for monitoring and verification of emission reductions achieved by a project.

National Allocation Plans (NAPs): The documents, established by each Member State and reviewed by the European Commission, that specify the list of installations under the EU ETS and their absolute emissions caps, the amount of CERs and ERUs that may be used by these installations as well as other features such as the size of the new entrants reserve and the treatment of exiting installations or the process of allocation (free allocation or auctioning).

New South Wales Greenhouse Gas Reduction Scheme (NSW GGAS): Operational since January 1, 2003 (to last at least until 2012), the NSW Greenhouse Gas Abatement Scheme aims at reducing GHG emissions from the power sector. NSW and ACT (since January 1, 2005) retailers and large electricity customers have thus to comply with mandatory (intensity) targets for reducing or offsetting the emissions of GHG arise from the production of electricity they supply or use. They can meet their targets meet their targets by purchasing certificates (NSW Greenhouse Abatement Certificates or NGACs) that are generated through project activities.

New Zealand Emissions Trading Scheme (NZ ETS): The NZ ETS will progressively regulate emissions of the six Kyoto gases in all sectors of the economy by 2015. Forestry is covered since 2008 and by July 1, 2010, stationary energy, industrial process, and liquid fossil fuel will be phased-in. The government recently announced, however, that full implementation could be delayed if adequate progress is not made in establishing similar regulations in other developed countries.

Offsets: Offsets designate the emission reductions from project-based activities that can be used to meet compliance—or corporate citizenship—objectives vis-à-vis greenhouse gas mitigation.

Primary transaction: A transaction between the original owner (or issuer) of the carbon asset and a buyer.

Project Design Document (PDD): A central document of project-based mechanisms, the PDD notably describes the project activity (including environmental impacts and stakeholders consultations), the baseline methodology and how the project is additional as well as the monitoring plan.

Project Idea Note (PIN): A note prepared by a project proponent presenting briefly the project activity (e.g., sector, location, financials, estimated amount of ERs etc.).

REDD plus: All activities that reduce emissions from deforestation and forest degradation, and contribute to conservation, sustainable management of forests, and enhancement of forest carbon stocks.

Regional Greenhouse Gas Initiative (RGGI): Under RGGI, 10 Northeast and Mid-Atlantic states aim to reduce power sector CO_2 emissions by 10% be-

low 2009 levels in 2019. Within this 10-year phase, there are three shorter compliance periods. During the first and second compliance periods (2009–2011 and 2012–2014) the cap on about 225 installations is set at 171 $MtCO_2e$ (or 188 M short ton CO_2e). This is followed by a 2.5% per year decrease in cap during the third compliance period (2015–2018).

Reforestation: This process increases the capacity of the land to sequester carbon by replanting forest biomass in areas where forests have been previously harvested.

Registration: The formal acceptance by the CDM Executive Board of a validated project as a CDM project activity.

Removal unit (RMU): RMUs are issued by Parties to the Kyoto Protocol in respect of net removals by sinks from activities covered by Article 3(3) and Article 3(4) of the Kyoto Protocol**.**

Secondary transaction: A transaction where the seller is not the original owner (or issuer) of the carbon asset.

Supplementarity: Following the Marrakesh Accords, the use of the Kyoto mechanisms shall be supplemental to domestic action, which shall thus constitute a significant element of the effort made by each Party to meet its commitment under the Kyoto Protocol. However there is no quantitative limit to the utilization of such mechanisms. While assessing the NAPs, the European Commission considered that the use of CDM and JI credits could not exceeded 50% of the effort by each Member State to achieve its commitment. Supplementarity limits may thus affect demand for some categories of offsets.

United Nations Framework Convention on Climate Change (UNFCCC): The international legal framework adopted in June 1992 at the Rio Earth Summit to address climate change. It commits the Parties to the UNFCCC to stabilize human induced greenhouse gas emissions at levels that would prevent dangerous man-made interference with the climate system, following "common but differentiated responsibilities" based on "respective capabilities".

Validation: Validation is the process of independent evaluation of a project activity by a Designated Operational Entity (DOE) against the requirements of the CDM. The CDM requirements include the CDM modalities and procedures and subsequent decisions by the CMP and documents released by the CDM Executive Board.

Verified Emission Reductions (VERs): A unit of greenhouse gas emission reductions that has been verified by an independent auditor. Most often, this designates emission reductions units that are traded on the voluntary market.

Verification: Verification is the review and ex post determination by an independent third party of the monitored reductions in emissions generated by a registered CDM project, a determined JI project (or a project approved under another standard) during the verification period.

Voluntary market: The voluntary market caters for the needs of those entities that voluntarily decide to reduce their carbon footprint using offsets. The regulatory vacuum in some countries and the anticipation of imminent legislation on GHG emissions also motivates some pre-compliance activity.

Western Climate Initiative (WCI): The WCI covers a group of seven U.S. states (Arizona, California, Montana, New Mexico, Oregon, Utah, and Washington) and four Canadian provinces (British Columbia, Manitoba, Ontario, and Quebec), with an aggregate emissions target of 15% below 2005 levels by 2020. Other U.S. and Mexican states and Canadian provinces have joined as observers.