

**OVERVIEW**

Carbon markets have a crucial role in achieving global objectives of reduced carbon emissions as set out in the Kyoto Protocol. This IFSL report notes that trading has expanded rapidly in the past few years with 2,983 million tonnes of CO<sub>2</sub> being traded in 2007, 70% up on 2006 (Chart 1).

The EU's Emissions Trading Scheme (EU ETS) continues to be the largest carbon markets scheme in both volume and value and dominates allowance-based transactions. National Allocation Plans of countries have been capped by the Commission to ensure that Phase II of the EU ETS is 'short'. It is proposed that the scope of EU ETS in Phase III be extended to new sectors, such as chemical and ammonia producers. Bankability of allowances from Phase II to future compliance periods is also proposed. This is designed to prevent the collapse in prices associated with the surplus of allowances in 2007. Prices of 2008 and 2009 Phase II futures contracts have held up at over \$20 per tonne of CO<sub>2</sub> since May 2007.

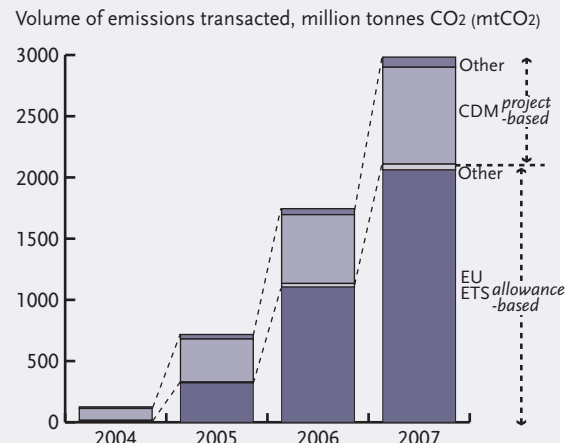
The purchase of credits from carbon reducing projects in developing countries, mainly China, by companies and organisations in European countries, particularly the UK, has resulted in the Clean Development Mechanism (CDM) forming the vast majority of project-based transactions. Secondary trading made up nearly a third of CDM transactions in 2007 up from 4% in 2006. CDM is under review and some reform is expected. The voluntary market has also grown and matured in 2007, particularly in the US.

The launch of negotiations for a new UN agreement will shape the future of carbon markets. All participants at the December 2007 Bali conference committed to a timetable which is intended to deliver an agreement post-2012. Major issues will need to be resolved if more countries are to participate in the post-2012 agreement.

The first major US carbon markets scheme, the Regional Greenhouse Gas Initiative, is to be launched in 2009. This builds on the voluntary commitments made through the Chicago Climate Exchange. The Midwestern Greenhouse Gas Accord in the US is also taking shape. Elsewhere Australia is moving towards a domestic emissions trading scheme by 2010, building on the New South Wales GHG Abatement Scheme. The International Carbon Action Partnership has been formed by countries and regions implementing or working towards mandatory cap and trade regimes in carbon markets.

London is a leading global centre in carbon markets. The UK is lead investor in CDM, accounting for 59% of purchases in 2007, and the carbon futures contract traded on ECX in London remains the dominant exchange contract in the EU ETS. London gained key experience from the UK's voluntary Emissions Trading Scheme which ran from 2002 to 2006. Carbon markets are increasingly intertwined with the emerging industry for renewable energy development: London is a key centre in the provision of finance to this market, with 69 renewable energy companies having joined the Alternative Investment Market (AIM) by the end of 2007.

**Chart 1 Global carbon markets**



Year	Allowance-based <sup>1</sup>	Project-based <sup>2</sup>	Total
2004	16	110	126
2005	329	388	717
2006	1134	611	1745
2007	2109	874	2983

Year	Value of trading, \$bn	Value of trading, \$bn	Total
2004	---	0.5	0.5
2005	8.0	2.9	10.9
2006	24.7	6.5	31.2
2007	50.4	13.6	64.0

<sup>1</sup> See also Table 2 on allowance-based transactions  
<sup>2</sup> See also Table 4 on project-based transactions  
Source: World Bank

## CARBON MARKETS

Carbon markets involve the buying and selling of emission allowances and reduction credits in order to enable countries and companies to meet their compliance objectives with respect to greenhouse gas emission (GHG) targets under the Kyoto Protocol.

### The Kyoto Protocol

The Kyoto Protocol to the United Nations' Framework Convention on Climate Change (UNFCCC) was signed in 1992. Under Kyoto a total of 36 industrialised countries, plus the EU en bloc, were given specific limitations in carbon emissions to be met during the 2008-2012 period. These limitations were to be benchmarked against their emissions in 1990. A further 137 developing countries have ratified the protocol but have no obligation beyond monitoring and reporting emissions. The US has not yet ratified the treaty. Although developing countries do not have specific targets they are integral to global plans on carbon emissions and are key players in the carbon markets. Industrialised and developing countries are referred to, respectively, as 'Annex 1' and 'non-Annex 1' countries.

The target for Annex 1 countries was to reduce emissions by an average of 5% between 1990 and 2008-2012. Within the 8% reduction target that the EU was given there was a broad range of targets depending on the weight given to countries' emissions in 1990: so Germany's target was more stringent at a 21% reduction while France was set at a standstill (Table 1). Economies in transition (EIT) from a centrally planned to a market economy (representing those countries in central and Eastern Europe, including the former republics of the Soviet Union) can be reviewed separately to non-EIT countries.

Emissions in EIT countries, particularly the large countries of Russia, Ukraine and Poland, are well below their emissions limitation (Chart 2). However much of this occurred in the years following 1990 when the inefficiency of heavy industry in those countries contributed to deindustrialisation. Since the mid-1990s little further progress has been made and CO<sub>2</sub> emissions in EIT countries were slightly higher in 2005 than a decade earlier. In Western Europe, the UK, Germany and France are on course or close to reaching their target. Elsewhere in Europe, Spain and Italy are likely to exceed their target. Canada has indicated that it no longer plans to try to meet its Kyoto target.

Flexible mechanisms allow Annex 1 countries to meet GHG emissions limitation by purchasing emission reductions from elsewhere. International emissions trading, such as the EU ETS is one mechanism. Credits can also be purchased from accredited projects which reduce emissions in non-Annex 1 countries under the Clean Development Mechanism (CDM) or in other Annex 1 countries under Joint Implementation (JI).

The effect of these trading mechanisms is to introduce a price for carbon, placing a cost on emissions and a value on reductions. While a moderate volume of trading in carbon markets has taken place since the late 1990s, the market for both allowance and project based transactions has expanded

Table 1 Progress towards Kyoto targets

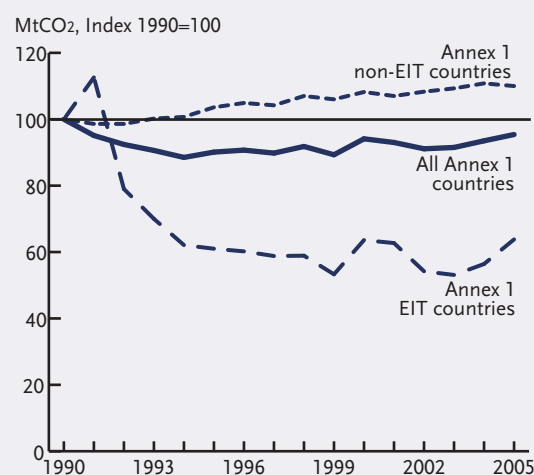
Greenhouse gas emissions <sup>1</sup>	in emissions		% change achieved 1990-2005	Target for 08-12 as % change from 1990 emissions
	1990 mtCO <sub>2</sub>	2005 mtCO <sub>2</sub>		
US	5529	6432	16.3	-7 <sup>2</sup>
Russia	3166	2289	-27.7	0
Japan	1180	1264	7.1	-6
Germany	1200	965	-19.5	-21
Canada	473	730	54.2	-6
UK	774	655	-15.4	-12.5
Australia	500	522	4.5	8
France	533	495	-7.1	0
Italy	437	470	7.4	-8
Spain	245	391	59.8	15
Poland	453	367	-19.0	-6
Ukraine	872	360	-58.7	---
Other countrs.	2020	1807		
Total	17383	16748	-3.7	-5
Note: EU	4040	3878	-4.0	-8

<sup>1</sup>Data includes emissions arising from land use, land use change & forestry

<sup>2</sup>US has not ratified Kyoto Protocol

Source: United Nations Framework on Climate Change (UNFCCC)

Chart 2 Greenhouse gas emissions of Annex 1 countries



Source: UN Framework Convention on Climate Change (UNFCCC)

rapidly since 2004 with extensive take up of new trading schemes.

### Allowance based transactions

Allowance based markets, under which a buyer purchases emissions allowances under cap-and-trade regimes (see panel below), include the EU ETS, the New South Wales GHG abatement scheme and the Chicago Climate Exchange (CCX). Allowance-based transactions, which are dominated by the EU ETS, accounted for 71% of emissions trading by volume and 79% by value in 2007 (Table 1).

**EU Emissions Trading Scheme (EU ETS)** The EU ETS is much the largest carbon market in both value and volume. The volume of carbon emissions traded on EU ETS rose 87% from 1,104 mtCO<sub>2</sub> in 2006 to 2,061 mt in 2007 (Table 2). The value of trading on EU ETS doubled from \$24bn in 2006 to \$50bn in 2007.

The bulk of trading in EU ETS takes place on the European Climate Exchange (ECX) EUA futures contracts that are traded on the ICE Futures Europe exchange in London (Chart 3). Over 1bntCO<sub>2</sub> was traded though ECX in 2007, accounting for 89% of EU ETS exchange transactions. The balance was made up by the Oslo-based Nord Pool, BlueNext in France and

### Types of carbon transactions

Carbon transactions involve contracts in which one party pays another in exchange for a given quantity of greenhouse gas emissions\* (GHG) reduction.

**I. Allowance-based transactions in cap & trade regimes:** Involve emission allowances credited and allocated (or auctioned) by regulators under cap-and-trade regimes. Examples include the European Union Allowance (EUA) under the EU Emissions Trading Scheme (EU ETS). "Cap and Trade" allowance markets establish a flexible structure to achieve the desired environmental performance targets. Major schemes:

- *EU Emissions Trading Scheme (EU ETS)*
  - i. Exchange trading: European Climate Exchange (ECX), BlueNext, Nord Pool, European Energy Exchange (EEX)
  - ii. OTC (some OTC contracts cleared on exchanges)
  - iii. Bilateral trades
- *New South Wales (NSW) GHG abatement scheme* in Australia
- *Chicago Climate Exchange (CCX)* in US

**II. Project-based transactions:** The buyer purchases emission credits from a project that can verifiably demonstrate reduction in greenhouse gas emissions. Schemes include:

#### **I. Compliance**

- *Clean Development Mechanism (CDM)* of Kyoto Protocol: investment in projects in developing countries that generate Certified Emission Reductions (CERs)
- *Joint Implementation (JI) Framework* of Kyoto Protocol: investment in projects in industrialised countries that generate Emission Reduction Units (ERUs)

#### **II. Voluntary & retail**

#### \*Greenhouse gases in Kyoto Protocol

The Kyoto Protocol identified six greenhouse gases (GHG) as major contributors to global warming. These include: carbon dioxide CO<sub>2</sub>, hydrofluorocarbons HFCs, methane CH<sub>4</sub>, nitrous oxide N<sub>2</sub>O, perfluorocarbons PFCs, and sulphur hexafluoride SF<sub>6</sub>. Of these, carbon dioxide is the biggest contributor and data on emissions reduction are normally converted into carbon dioxide equivalent in order to facilitate assessment and comparison.

**Table 2 Allowance-based transactions**

Volume of trading, mtCO <sub>2</sub>					
	EU ETS	NSW	CCX	UK ETS	Total
2004	8	5	2	0.5	16
2005	321	6	1	0.3	329
2006	1104	20	10	---	1134
2007	2061	25	23	---	2109

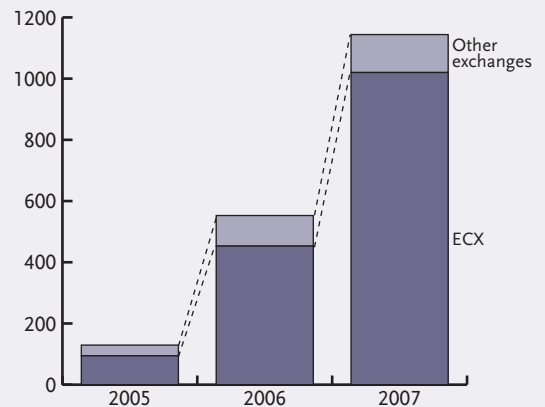
  

Value of trading, \$m					
	EU ETS	NSW	CCX	UK ETS	Total
2005	7908	59	3	1	7971
2006	24436	225	38	---	24699
2007	50097	224	72	---	50393

Source: World Bank

**Chart 3 EU ETS exchange trading**

Volume of emissions transacted, million tonnes CO<sub>2</sub> (mtCO<sub>2</sub>)



mtCO <sub>2</sub>	ECX	Nord Pool	Blue-Next	EEX	Total
2005	94.3	28.0	4.4	2.8	129.4
2006	452.9	59.6	31.5	8.8	552.7
2007	1020.0	95.1	23.8	5.0	1144.0

% share	ECX	Nord Pool	Blue-Next	EEX	Total
2005	72.9	21.6	3.4	2.1	100.0
2006	81.9	10.8	5.7	1.6	100.0
2007	89.2	8.3	2.1	0.4	100.0

Source: ECX, Nord Pool, BlueNext, EEX

the European Energy Exchange (EEX) in Germany. While the majority of transactions were struck over-the-counter, many OTC trades were cleared through the exchanges boosting the volume of exchange trades.

Trading has become a key part of compliance strategy used by companies to meet their obligations under the EU ETS (Chart 4). It is the sole strategy used by 17% of 450 companies surveyed by Point Carbon, while it is used alongside internal abatement (reduction of emissions within the company) and investment in projects to offset emissions by a further 48%. Some 30% of companies rely solely on internal abatement.

Phase I of the EU ETS which ran from 2005 to 2007 was successful in achieving its initial goals of obtaining experience from emissions trading; developing institutions; achieving improvements in environmental performance; gaining understanding of price discovery and how to distribute allowances effectively. For Phase II (2008-2012), which is concurrent with the First Commitment Period of the Kyoto Protocol, the European Commission has imposed tighter National Allocation Plans (NAPs) to achieve reduction in emissions.

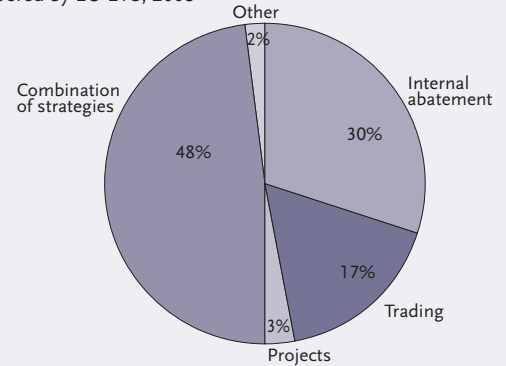
Overall the reviewed NAPs for 2008-2012 have been reduced by 10% below the caps that were originally proposed by each of the 27 member states (Table 3). For the Eastern part of the EU (the EU-12) there is an average reduction of 25% on their proposed caps, although the caps of Latvia, Estonia and Lithuania were reduced by about a half. The EU-12 will still be permitted a 3.6% increase on their 2005 emissions under the Commission's decisions on NAPs, although these are being challenged by some new member states. The countries of western EU (EU-15) are required to achieve an 8.7% cut in their verified 2005 emissions by 2008-12. The five largest countries - Germany, UK, Poland, Italy and Spain - will account for 60% of allowances.

The bulk of emissions reductions in Phase II are focused on the power sector, which is less exposed to foreign competition and where reduction can be achieved at lower cost. France and the Netherlands have unilaterally brought sectors emitting nitrous oxide into Phase II. The proposed inclusion of air transport, which accounts for 3% of EU emissions, would be the most significant extension of Phase II. Provisions for auctioning of allowances is extended to up to 10% of allowances from 0.2% in Phase I, but only Germany and the UK are likely to take this up to any significant extent: the UK is to auction 7% of allowances.

It is proposed that the scope of EU ETS in Phase III be extended to new sectors, such as chemical and ammonia producers, which will bring new gases into the scheme. Bankability of allowances from Phase II to future compliance periods is also proposed. This is designed to prevent the collapse in prices in early 2007 (Chart 5). At that time, an excess supply of allowances caused the price of 2007 futures contracts to plummet close to zero, because it was not possible to bank these allowances for Phase II. Prices of 2008 and 2009 Phase II futures contracts have held up at over €20 per tonne since May 2007.

Chart 4 Compliance strategies in EU ETS

% share of 451 companies surveyed with emissions covered by EU ETS, 2008



Source: Point Carbon

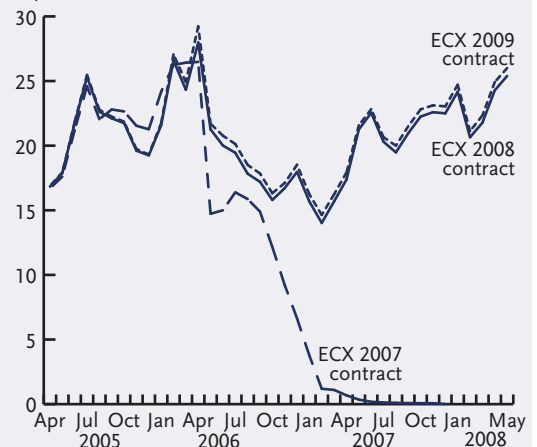
Table 3 EU ETS: National Allocation Plans for Phase II

	Cap proposed by country mtCO <sub>2</sub>	Cap allowed by EU mtCO <sub>2</sub>	Share of allowance % share	Adjustment to 2005 emissions % change
Germany	482	453	21.6	-7
UK	246	246	11.7	-13
Poland	285	209	9.9	0
Italy	209	196	9.3	-13
Spain	153	152	7.3	-22
France	133	133	6.3	-3
Czech Rep.	102	87	4.1	5
Netherlands	90	86	4.1	2
Other countries	626	521	24.9	
Total EU-27	2325	2083	99.3	-6
Norway	---	15	0.7	-17
EU-15	1637	1569	74.8	-9
EU-12	689	514	24.5	4

Source: European Commission published by World Bank

Chart 5 Price of EU emission allowances

ECX EUA Futures contract, monthly average, € per tonne of emissions



Source: European Climate Exchange

Looking further ahead, the EU has proposed a reduction in overall emissions in 2020 to at least 20% below 1990 levels. This would incorporate a mandatory EU target of renewable energy accounting for 20% of energy requirements. The EU will also commit to scaling up to a 30% reduction in emissions in the context of an international agreement, in which other developed countries make comparable efforts.

**Chicago Climate Exchange (CCX)** CCX, a self-regulatory exchange, represents a voluntary, legally-binding commitment by North American corporations, municipalities and other institutions to establish a rules-based market for reducing greenhouse gases. CCX members made commitments to reduce CO<sub>2</sub> emissions to 6% below a baseline period of 1998-2001. Trading has risen from 1mtCO<sub>2</sub> in 2005 to 10mt in 2006 and 23mt in 2007.

**New South Wales GHG Abatement Scheme** Under this scheme, introduced in 2003, electricity distributors in New South Wales in Australia are required to reduce annual GHG emissions. Trading of emissions jumped from 6mtCO<sub>2</sub> in 2005 to 25mt in 2007. Australia ratified the Kyoto Protocol in 2007 and is on target to meet its target of 8% above 1990 levels. The Australian government has introduced an accelerated timetable for the introduction of a domestic emissions trading scheme to start by 2010.

### Project-based transactions

Investment in projects can be divided into two broad categories:

- Compliance schemes in which companies and other organisations invest in projects in other countries to offset the impact of carbon emissions in their home market in order to fulfil the requirements of the Kyoto Protocol or national scheme.
- Voluntary schemes in which individuals or organisations can voluntarily offset carbon emissions through investments in, for example, planting a forest or building a wind farm. Activity in the voluntary market is a small fraction of transactions in compliance schemes.

The World Bank cites the main groups of compliance buyers:

- Government buyers interested in Kyoto compliance.
- European private buyers interested in the EU ETS.
- Japanese companies with voluntary commitments under the Keidanren Voluntary Action Plan.
- Asset managers, including carbon funds and hedge funds, investing in a new commodity market.
- Intermediaries, such as trading houses, compliance funds and banks.
- US companies operating in Japan and Europe or that are preparing for the Regional Greenhouse Gas Initiative (RGGI) and other US regional initiatives.
- North American companies with voluntary but legally binding compliance objectives in the CCX.
- Power companies and large consumers regulated by the New South Wales market in Australia.

Demand for Certified Emissions Reductions (CERs) from European and

### **The UK Emissions Trading Scheme (UK ETS) 2002-2006**

UK ETS was launched ahead of the EU ETS in 2002 and was the first economy-wide GHG trading reduction scheme. Participation was on a voluntary basis for companies that took on absolute targets for GHG reductions. The 34 participants were estimated to have reduced emissions by around 7 mtCO<sub>2</sub> over its five year lifespan between 2002 and 2006. The UK ETS also gave the government and service providers in London early experience of emissions trading.

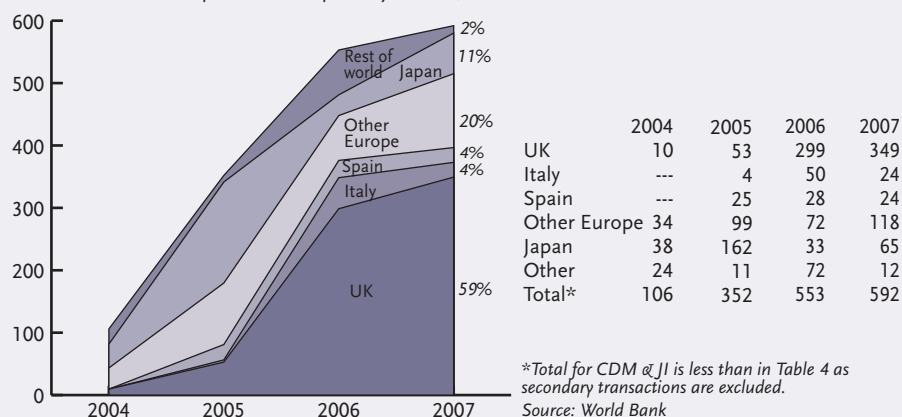
**Table 4 Project-based transactions**

	Volume of trading, mtCO <sub>2</sub>					Total
	Compliance total	-----of which-----			Voluntary & retail	
		CDM primary	CDM secondary	Jl		
1998-2003	---	---	---	---	---	155
2004	106	97	---	9	4	110
2005	362	341	10	11	26	388
2006	578	537	25	16	33	611
2007	832	551	240	41	42	874
Value of trading, \$m						
1998-2003	---	---	---	---	---	400
2004	539	485	---	54	10	549
2005	2706	2417	221	68	231	2937
2006	6390	5804	445	141	146	6536
2007	13376	7426	5451	499	265	13641

Source: World Bank

**Chart 6 Investors in CDM & JI projects**

Volume of emissions purchased in primary market, mt CO<sub>2</sub>



Japanese companies has substantially increased investment in project-based transactions in recent years. Some 874 mtCO<sub>2</sub> was transacted in 2007, 43% up from 611mt traded in 2006, and eight times the 2004 volume of 110mt (Table 4). The development of standard terms for secondary CERs provided the basis for a viable secondary market. Transactions in the secondary market increased nearly tenfold from 25mtCO<sub>2</sub> in 2006 to 240mt in 2007, with their share of CDM transactions rising from 4% to 30%. Higher prices in the secondary market meant that its share of the value of CDM trading rose from 7% to 42%. The underlying value of all primary and secondary trading in CDM doubled from \$6.3bn to \$12.9bn. Including JI and voluntary markets the total value of project-based transactions reached \$13.6bn.

**Primary investors in CDM and JI projects** Over 90% of project-based primary transactions between 2005 and 2007 were in CDM in developing countries (non-Annex 1). The UK retained its position as the leading investor in CDM and JI projects in 2007 with 59% of purchases, up from 54% in 2006 (Chart 6). European countries made up 87% of CDM & JI investments. The only other significant investor was Japan, which with 11% of investments was only exceeded by the UK.

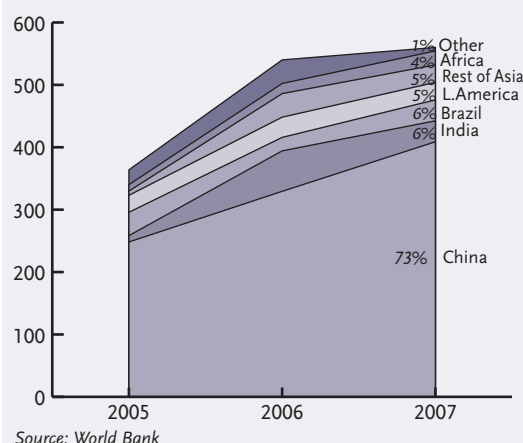
The UK's prominent position as an investor in 2006 and 2007 was based on purchases by banks, carbon funds and other financial institutions in London. Such private sector buyers accounted for most CDM investments, and also emerged for the first time in 2007 as significant buyers of JI projects.

**Location of CDM projects** China has supplied the majority of CDM credits, and accounted for 73% of market volumes in 2007, down from 61% in 2006 but the same share as in 2005 (Chart 7). India and Brazil each had 6% share of the CDM market. The rest of Latin America and Asia each made up 5% of projects while Africa accounted for 4% of projects.

A breakdown of 1,079 CDM projects as at June 2008 presents a different picture (Chart 8). As the size of projects in China has been larger than elsewhere, its share of all registered projects was much lower: 221 projects in China made up 20% of the total. With 344 projects, nearly a third of the

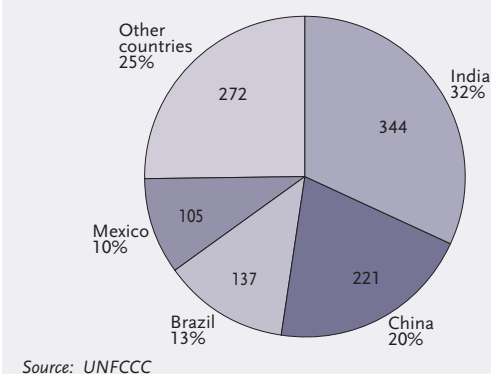
**Chart 7 Location of CDM projects**

Volume supplied to CDM market by country, mt CO<sub>2</sub>



**Chart 8 CDM registered projects**

% share of 1,079 projects registered, June 2008



total, India has the most projects. Brazil and Mexico are also major destinations, each with over 100 projects registered. These four countries together account for three quarters of projects, with Malaysia being the next largest location with 28 projects.

**Location of JI projects** JI projects in industrialised countries generated carbon reductions of 41 mtCO<sub>2</sub> in 2007, almost as much as the previous four years combined. Overall, JI makes up only 5% of the compliance market, which is dominated by CDM. Most JI investments in 2007 were in Russia and the Ukraine (Table 5).

**Prices of Certified Emission Reductions (CER)** Average prices in the primary market for CERs of CDM projects have risen steadily from an average \$5 per tonne in 2004 to \$11 in 2006 and over \$13 in 2007 (Chart 9). Primary prices of CERs have been higher than ERUs of JI projects over the past three years, with the latter reaching \$12 in 2007. CERs in the secondary market recovered to an average of \$23 per tonne in 2007.

**Asset classes of CDM projects** Clean energy projects accounted for around two thirds of CDM projects. These consist of energy switching and fuel efficiency, up from 9% to 40% of the total; hydro electric power rising from 6% to 12%; and wind power increasing from 5% to 7% (Table 6).

Destruction of HFC gases has seen a big reduction in market share from 64% in 2005 to 8% in 2007, as scope for such projects has been used up. Reduction of these synthetic or industrial gases offered a significant opportunity in the early stage of compliance as it is relatively inexpensive and can be introduced in a short timescale. Landfill gas is a key mechanism for depositing carbon emissions. Extraction of Coal Mine Methane (CMM) from abandoned mines has provided an alternative source of electricity.

**Voluntary markets** An increasing number of companies are offering project-based emission reductions to companies that wish to offset GHG emissions from their operations and to individuals that wish to offset GHG emissions associated with their way of life. Carbon offsets in voluntary markets have grown steadily to reach 42mtCO<sub>2</sub> in 2007, plus a further 23mt of trades on CCX, which is a voluntary exchange. The US accounts for the majority of trading in the voluntary market, which is benefiting from the development of standards and registries. In order to secure additionality and permanence of reductions, buyers have been investing in proven projects such as methane capture, destruction of landfill gas and renewables.

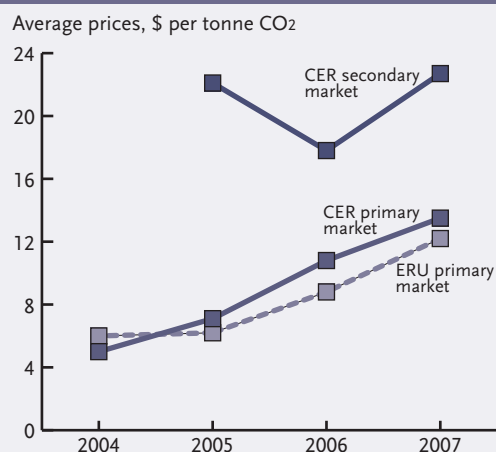
In February 2008, the UK Government announced the framework for the Code of Best Practice for Carbon Offsetting. The Code is voluntary and offset providers can choose whether to seek accreditation for all, or some, of their offsetting products. The Code initially covers compliance credits (e.g. CERs), but the industry has been challenged to develop a standard for Voluntary Emissions Reduction (VER) credits which could be included in the future, subject to appropriate verification. The UK Government believes that the development of the VER market can add value outside of international mechanisms for carbon reduction, by bringing forward innovative offset projects. These can be tried and tested and may then inform the further development of the compliance market.

**Table 5 Location of JI projects**

	Volume supplied to JI market by country, mtCO <sub>2</sub>		% share	
	2003-06	2007	2003-06	2007
Ukraine	9	14	21	33
Russia	8	15	19	36
Bulgaria	8	4	18	9
Hungary	3	---	7	---
Poland	2	4	5	9
Romania	---	2	---	6
New Zealand	2	0	4	1
Other/unsp.	11	2	26	6
	43	41	100	100

Source: World Bank

**Chart 9 Prices of project-based assets**



Source: World Bank

**Table 6 Asset class of CDM projects**

	Volume of CDM projects, mtCO <sub>2</sub>			% share		
	2005	2006	2007	2005	2006	2007
Energy effy	3	49	224	1	9	40
Hydro	10	32	67	3	6	12
Nitrous oxide	0	70	50	---	13	9
HFC-23	218	184	45	64	34	8
Wind	7	27	39	2	5	7
CMM	27	38	28	8	7	5
LFG	34	27	28	10	5	5
Biomass	10	16	28	3	3	5
Animal waste	7	11	---	2	2	---
Others	24	86	50	7	16	9
Total	340	540	560	100	100	100

Source: World Bank

### Market developments

The shape of carbon markets is being influenced by a number of developments including the mandate to move forward on a post-2012 agreement; other measures to help countries meet their Kyoto commitments; growing momentum in the US and other countries; and review of CDM.

**Bali mandate on post-2012 agreement** All participants at the UN conference in December 2007 agreed to a timetable of negotiations which is intended to deliver an international agreement for carbon markets post-2012. The aim is to sign an agreement at the UNFCCC Conference of Parties in Copenhagen in 2009. Strong differences remain between the EU; a group of developed countries including the US, Canada, Japan and Australia; and major developing countries. Issues to resolve will include the establishment of a quantified emissions reduction target and the number of countries it should apply to. The EU and a group of 77 developing countries (G-77) are insisting on a clear division between Annex 1 and non-Annex 1 countries with regard to commitments and actions. Developing countries are looking for support with regard to technology transfer, capacity building, financial assistance and action to avoid deforestation.

The expectation is that developed countries will have to agree to binding cuts if there is to be an international agreement. Commitment to an intermediate target for cuts in carbon emissions by 2020-25, in addition to long term aims for 2050, is also likely to be an important feature of a future agreement.

Despite considerable differences to be resolved, Point Carbon's 2008 report indicated that at least a half of its survey participants expect all the major developed countries including Europe, Japan, Australia, Canada, New Zealand, Russia and the US to participate with commitments in a post-2012 scheme (Chart 10). There was less confidence about wider buy-in with only about a third saying that other countries such as Ukraine, South Korea, China, India and Mexico would participate. In the longer term the UN would seek to link and integrate the various GHG emissions trading systems set up by different countries.

**Measures to meet Kyoto commitments** Other measures agreed at Bali in December 2007 to enable Parties to UNFCCC to meet their commitments to the Kyoto Protocol included:

- *Deforestation* Programmes to enable countries to address drivers of deforestation will be implemented. This is important because measures to mitigate emissions associated with deforestation in developing countries are likely to be a key component of the climate change regime beyond 2012.
- *Reforestation* Size of small-scale projects to be doubled to 16 kilotonnes of CO<sub>2</sub> a year.
- *Technology* Governments to initiate investment to help transfer to developing countries the mitigation and adaptation technologies that they need.

There was also discussion but no decision reached regarding the inclusion

**Chart 10 Expected participation in post-2012 UN agreement**



Source: Point Carbon

within CDM of projects involving carbon capture & storage (CCS).

**US initiatives** The launch of *Regional Greenhouse Gas Initiative (RGGI)* is a cooperative effort in the US by eight North eastern and mid-Atlantic states to reduce carbon dioxide emissions from electricity power plants in the region. The participating states have committed to cap and then reduce the amount of CO<sub>2</sub> that certain power plants are allowed to emit, limiting the region's total contribution to GHG emissions. Under this regional cap-and-trade scheme, the states anticipate auctioning nearly the entire annual regional emissions which is expected to be set at 188m short tons of CO<sub>2</sub>. Initial auctions are scheduled for September and December 2008. In the future, RGGI may be extended to include other sources of GHG emissions.

Other regional initiatives in the US are also taking shape. *The Western Climate Initiative (WCI)*, which involves six US Western states and two Canadian provinces, has announced a joint target of 15% below 2005 GHG emissions by 2020. *The Midwestern Greenhouse Gas Accord* involves six participating states aimed at reducing regional GHG emissions by 60-80% of current levels by 2050. Longer term the US could enact federal cap-and-trade legislation to manage the nation's GHG emissions. A US Senate Bill proposing a two-thirds reduction in carbon emissions by 2050 failed in June 2008, but received support from the majority of the Senate, including both US presidential nominees.

**Other international initiatives** As indicated on page 5, Australia plans to introduce a domestic emissions trading scheme by 2010 building on the *New South Wales GHG Abatement Scheme*. Japan is to start a trial system for carbon trading in autumn 2008. It has set a long-term goal of a 60-80% cut in carbon emissions by 2050, with an interim aim of a 14% reduction by 2020.

New Zealand announced the introduction of a cap-and-trade *New Zealand Emissions Trading Scheme (ETS)* in September 2007. The first phase of New Zealand ETS will run from 2008-12 with the introduction of sectors to the scheme being staged: forestry in 2008; liquid fossil fuels in 2009; and energy and industrial processes in 2010.

*The International Carbon Action Partnership (ICAP)* has been formed by countries and regions implementing or working towards carbon markets through mandatory cap and trade regimes. Members cover the European Commission and nine EU countries including France, Germany, Italy and the UK; 12 states in the US that are involved in RGGI or WCI; Australia; New Zealand; and Norway; with Japan having observer status. ICAP provides a forum to share experience and knowledge and evaluate best practice.

**Reform of CDM** Key challenges facing the CDM are the extent to which it supports development; the amount of additionality it provides and the effectiveness of project delivery and performance. Future projects are expected to include responsible use of fossil fuels as this will remain a key part of the energy mix for several decades. Perverse incentives will also need to be eliminated such as the clearing of natural forests in order to plant and extract palm oil, a project that qualifies as a CDM.

Complex monitoring requirements for large scale CDM projects has held back some projects, such as those projects that could contribute to energy demand in developing countries short of generating capacity. The adoption of simpler methodologies would contribute to removal of these barriers and bring more energy projects on stream.

**Market outlook for 2008 and beyond** Other findings from Point Carbon's assessment and survey of the carbon markets included:

- EUA prices are expected to be €24 per tonne in 2010 and €35 per tonne by 2020.
- Two thirds of EU ETS companies are implementing or planning emissions reduction of some kind. Three quarters of such companies say that the carbon price will influence future investment decisions.
- A federal ETS in the US by 2012 is expected although this is likely to be less rigorous than its EU counterpart.
- The prospects for a broader global market in emissions trading are improving. Nearly three quarters of survey participants thought that a global reference price for carbon by 2020 was likely.

#### **London's role as a leading centre of expertise**

London's key role as a leading global centre in carbon markets and emissions trading is evidenced by a number of factors:

- A core of experts with practical market experience through the whole supply chain of knowledge and products is well established in London. This has been facilitated by the UK gaining first mover advantage through launching the voluntary UK ETS in 2002.
- The EUA futures contract, the dominant exchange contract in the EU ETS, is traded on the ECX, based in London.
- UK is the leading investor in CDM and JI projects, with a 59% share of primary purchases of CDM and JI in 2007. This reflects purchases made by financial institutions in central London.
- Since 2000, 69 companies developing renewable technologies have joined the London Stock Exchange's Alternative Investment Market: their IPOs raised £1.6bn (Chart 11). Renewables will contribute to the long-term reduction of carbon emissions.

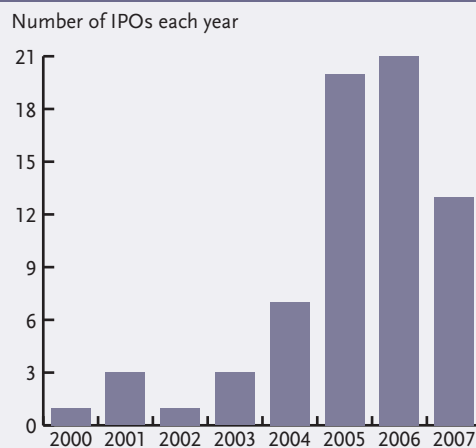
#### **Renewable energy market: IPOs on AIM**

Worldwide investment into renewable energy and clean technology sector was estimated to be above \$100bn in 2006. A report *Renewable Energy Companies on AIM 2007* by Growth Company Investor (in association with Hunton & Williams) found that the London Stock Exchange's Alternative Investment Market (AIM) was a natural home for companies operating in this sector.

At end-2007 there were 69 companies on AIM that could be identified as renewable companies spread across nine sectors: alternative power, biofuels, carbon credits, fuel cells, fuel economy/emissions, investment, recycling/bio-products, solar and wind.

Since 2000, £1.6bn has been raised on AIM with an average fundraising of £22m per company. Most of this activity has been concentrated in the past three years with the 13 IPOs in 2007 following about 20 in each of the two previous years and an aggregate total of 15 in the five years to 2004 (Chart 11).

**Chart 11 Renewable energy IPOs on AIM**



Source: Growth Company Investor

**SOURCES OF INFORMATION****Capacity Development for the Clean Development Mechanism**

Statistics on CDM and JI pipeline  
[cd4cdm.org](http://cd4cdm.org)

**Carbon Markets Association**

[www.carbonmarketsassociation.net](http://www.carbonmarketsassociation.net)

**Climate Change Projects Office (CCPO)**

[www.berr.gov.uk/sectors/ccpo](http://www.berr.gov.uk/sectors/ccpo)

**City of London Corporation/Consilience Energy Advisory Group (CEAG)**

Emissions Trading and the City of London September 2006  
[www.cityoflondon.gov.uk](http://www.cityoflondon.gov.uk)

**Department for Environment Food and Rural Affairs**

[www.defra.gov.uk/environment/climatechange/trading](http://www.defra.gov.uk/environment/climatechange/trading)

**Environmental Finance**

[www.environmental-finance.com](http://www.environmental-finance.com)

**Growth Company Investor**

Renewable Energy Companies on AIM 2007  
(Summary of report on London Stock Exchange website:  
[www.londonstockexchange.com](http://www.londonstockexchange.com))  
[www.growthcompany.co.uk](http://www.growthcompany.co.uk)

**HM Treasury/Cabinet Office**

Stern Review on the Economics of Climate Change 2006  
[www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk)

**International Carbon Action Partnership**

[www.icapcarbonaction.com](http://www.icapcarbonaction.com)

**International Emissions Trading Association**

Linking GHG Emissions Trading Systems  
[www.ieta.org](http://www.ieta.org)

**Point Carbon**

Carbon 2008: Post-2012 is now  
[www.pointcarbon.com](http://www.pointcarbon.com)

**Reuters**

Carbon Market Community  
[www.reutersinteractive.com/Carbon](http://www.reutersinteractive.com/Carbon)

**United Nations Framework Convention on Climate Change (UNFCCC)**

National Greenhouse Gas Inventory data for 1990-2005  
CDM Statistics  
[unfccc.int/2860.php](http://unfccc.int/2860.php)

**World Bank**

State and Trends of The Carbon Market 2008  
[www.carbonfinance.org](http://www.carbonfinance.org)

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This report *Carbon Markets 2008* is one of nine reports featuring product expertise in London. All IFSL's reports can be downloaded at:

**[www.ifsl.org.uk](http://www.ifsl.org.uk)**

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## IFSL Carbon Markets Group

IFSL has set up a Carbon Markets Group in 2008 chaired by Michael Woods, Head of the Environment Group at Stephenson Harwood. The remit of this group is threefold:

1. To share information between group members to ensure activities of the various organisations involved in promotion of carbon markets are properly coordinated.
2. To take the opportunity to reinforce and/or endorse policy positions taken by other groups.
3. To review the regulation and infrastructure of carbon markets with a view to putting forward proposals on how regulation and infrastructure could be improved.

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## Data files

Datafiles in excel format for all charts and tables published in this report can be downloaded from the Research section of IFSL's website **[www.ifsl.org.uk](http://www.ifsl.org.uk)**

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