

Special Feature

Carbon Credits – Impacts on and opportunities for Asia

“Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.”

Source: IPCC, Climate Change 2007: The Physical Science Basis

“Freshwater availability in Central, South, East and Southeast Asia, particularly in large river basins, is projected to decrease due to climate change which, along with population growth and increasing demand arising from higher standards of living, could adversely affect more than a billion people by the 2050s.”

Source: IPCC, Climate Change 2007: Impacts, Adaptation and Vulnerability

Global warming has reached the top of the Global CEO’s agenda in the past year. Yet, the historical causes and future impacts continue to be sources of heated debate. The first quote above is the closest that scientific evidence has yet come to conclusively stating that global warming is caused by human-induced changes. The second illustrates possible future changes in Asia, including crop yields, flooding of coastal areas and associated disease patterns.

Carbon Markets

Even as the debate on global warming and climate change continues, carbon markets continue to grow at a tremendous pace. A World Bank report puts the total market in 2006 at US\$30 billion, up from US \$11 billion in 2005 (see table).

The Kyoto Protocol signatory countries are working towards commitments to reduce their greenhouse gas emissions to specified levels. In addition to curbing emissions directly, the protocol also sets out other mechanisms to help satisfy these emission reduction requirements. As an example, compliance requirements can be met by purchasing Carbon Emission Reduction units (CERs). The introduction of this mechanism has resulted in development of a market for CERs within the overall carbon market.

It is estimated that Asia (China and India in particular) could account for over 80 percent of the sell side market for CERs. The largest segment and key driver of the carbon markets is the European Union Emission Trading Scheme.



World Carbon Market

	2005		2006	
	Volume Million tCO ₂ e	Value Million US\$	Volume Million tCO ₂ e	Value Million US\$
Allowances transactions				
EU ETS	321	7,908	1,101	24,357
New South Wales	6	59	20	225
Chicago Climate Exchange	1	3	10	38
UK ETS	0	1	n.a.	n.a.
Subtotal	328	7,971	1,131	24,620
Project based emission reduction transactions				
Primary CDM	341	2,417	450	4,813
Secondary CDM	10	221	25	444
Jl	11	68	16	141
Other compliance	20	187	17	79
Voluntary market	6	44	10	100
Subtotal	388	2,937	518	5,577
Total	716	10,908	1,649	30,197

Source: States and Trends of the Carbon Market 2007

The primary CDM transactions refer to the first sale of CERs from the project owner to the buyer. Secondary CDM transactions refer to on-sale of primary CERs.

Typical CER projects would include renewable energy projects (wind, solar, hydro, geothermal, biomass, etc.), fuel switch (switching from more carbon emission intensive fuel to lower/zero carbon emission intensive fuels), energy efficiency, waste heat/gas recovery including conversion of simple cycle into combined cycle operations, fugitive gas emissions capture (methane emissions from oil and gas exploration and coal mining), waste gas emissions capture (methane from solid waste and wastewater), reduction of PFC emissions in aluminium smelting, reduction in nitrous oxide emissions in manufacture of adipic acid and nitric acid, increase in additives in cement production, capture and destruction of HFC23 in HCFC22 refrigerant production, etc.

CER transaction pricing

Fixed price forwards have generally dominated the pricing framework in primary CDM transactions with some contracts having a combination of fixed and floating pricing structure. High volatility in the European Union Allowances (EUA) market coupled with regulatory developments (eg installation level caps on the use of CERs for compliance), have shifted the preference to fixed price contracts.



CER transactions are categorised as guaranteed (mark-to-market liquidated damages) versus non-guaranteed (best effort basis). The pricing differential between guaranteed and non-guaranteed CERs has diminished substantially.

CER transactions have so far been carried out exclusively in the OTC market. At least one carbon exchange has announced that it will commence CER forward/futures trading, while a commodity exchange in India has announced CER trading.

CER buyers

European buyers dominated carbon asset purchases (CERs/ERUs, vintages up to 2012) in 2006, with the UK accounting for almost half of carbon purchases (primary CDM). This was primarily the result of a significant decline in purchases by Japan, which accounted for 46 percent of primary carbon purchases in 2005, but just 7 percent in 2006.

European buyers tend to link CER purchase prices with European Union Allowances, after accounting for any cost of carry and discount for credit risk, project risk, liquidity risk, etc. In general, European buyers have tended to pay more than their Japanese counterparts who have less reason to link their pricing to that of the EU Emission Trading Scheme.

Carbon markets have been attracting significant interest from the investing community – from capital markets to hedge funds. The volume and number of funds investing in carbon markets is estimated to have risen to close to US\$12 billion spread across almost 60 carbon funds. This compares with a US\$70 billion investment in clean tech investments in 2006, with almost all the major investment banks joining the fray.

Governments continue with the procurement of emission reductions from the project based mechanisms. However, they have moved from the CDM market to Joint Implementation (JI) projects, where funds go directly to finance emission reduction projects vs. purchasing existing credits. Governments were involved in almost 90 percent of the JI project transactions in 2006.

Demand for CDM projects

During the period 2008-12, demand from the EU (both from announced government purchases as well as the EU-ETS) and Japan is expected to continue. Canada may bring forth significant demand depending on the path it takes to achieve the Kyoto targets pursuant to its announcement in April 2007 of improving the carbon intensity.

On the other hand, there is a large surplus of carbon allowances from Russia, Ukraine and Eastern Europe that could meet the requirement of allowances from the EU, Japan and Canada several times over.

There is significant interest developing in the US on account of the Regional Greenhouse Gas Initiative and the California Assembly Bill 32. But these may not place significant demand for CDM projects during the period up to 2012.

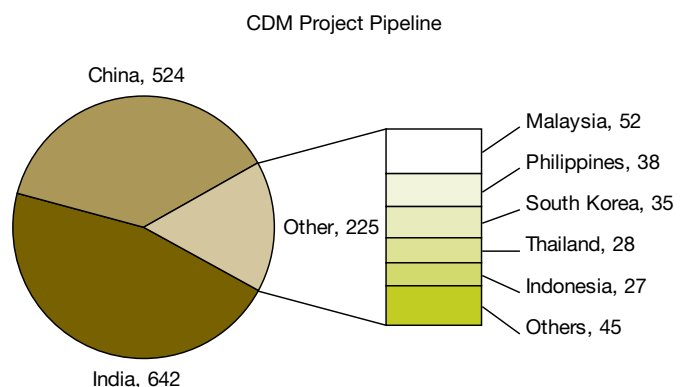
EU ETS Phase III (beyond 2013) is expected to keep the momentum of carbon markets going. It is expected that there would be regional greenhouse gas markets (including in the US) that would be linked to the EU ETS and would provide the framework for future carbon market development.

CDM Projects

Geographical spread

The CDM project market is dominated by Asia with close to 70 percent of the CDM projects developed/under development. India continues to lead the CDM projects market. However, China is clearly a leader in volume terms accounting for a little over 50 percent of the CERs from all CDM projects in the world and over 65 percent of all the CERs from Asia.

The chart below shows the number of CDM projects in the pipeline (listed on the UNFCCC web-site) in the Asian countries, totalling almost 1400. In addition, there would be several other projects that are in the development stage and have not yet reached this milestone.



Source: CDM pipeline, UNEP – Risø Centre



Project technologies

The table below shows the various categories of CDM projects in the UNFCCC pipeline (million tCO₂e emission reductions up to 2012) across the Asian countries.

UNFCCC CDM Project Pipeline

	Biomass	Fugitive	Energy Efficiency	Renewable	Fossil fuel switch	Hydro-fluoro carbons	Nitrous Oxide
China	21	141	97	167	89	392	110
India	65	5	81	51	39	76	
Indonesia	9	4	4	4			
Malaysia	18	16	4				
Philippines	5	1	0.3	2			
South Korea	0.5	16	3	3	1	14	68
Thailand	12	3					
Others	9	8	1	7			
Total	140	194	190	233	129	482	178

Source: CDM pipeline, UNEP – Risø Centre

Industrial projects like the removal of hydrofluorocarbons (capture and destruction of waste gas in refrigerant manufacturing) and nitrous oxide (reduction in emissions in adipic/nitric acid manufacturing) in China dominate the CDM portfolio.

China and India have CDM projects across sectors whilst South Korea has large reduction projects in industrial gases (HFC23, N₂O). Biomass based electricity generation and fugitive gas emission reductions (including from waste) are predominant projects in Malaysia, South Korea and Thailand.

It is interesting to note that renewable energy projects (wind, hydro, solar, geothermal, etc.) constitute a significant proportion of the emission reductions – the second largest after HFC23 emission reduction projects.

Transportation, agriculture and afforestation/reforestation projects are conspicuous by their very negligible proportion in the current CDM portfolio.

New project categories including bio-fuels, carbon capture and storage and energy efficiency (particularly through large-scale programmatic CDM) are expected to keep the momentum of supply of CDM projects.

Conclusion

The management and the outcome of reduction of greenhouse gas emissions is often questioned and the attendant benefit of stabilising the earth's temperature and avoiding the related consequences is hotly debated. Yet, despite the perceived merits or demerits of the carbon credit trading schemes, the carbon markets continue to display a remarkable resilience and continue to grow in strength.

The impact of the carbon markets is already beginning to be reflected in valuations of corporations in energy and energy intensive industries. As the carbon markets continue to grow, the carbon profile of assets is likely to emerge as a key factor in valuations and eventually in triggering M&A activity itself.



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