

# Carbon Trading: Product directory

---

December 20, 2009

*Copenhagen has gone, but carbon trading and carbon related investments haven't. So do you know one end of the carbon product spectrum from the other?*

In recent weeks BRAVE Partners has written about the state of and outlook for the carbon market. Notwithstanding the fact that the outcome from Copenhagen was most unsatisfactory, the market for carbon and related investments continues (for now).

So this week we take a look at the current product structures available to investors and the evolution of exotic products.

## Today market participants can:

- trade on the spot and forward market
- trade futures and options on carbon allowances and credits through exchanges
- benefit from the development of a number of exotic products

## We look at all the available alternatives in turn:

### FORWARDS:

In the financial markets it is usually the case that when a new asset begins trading the first transactions are done on a spot basis and derivative products are introduced only at a later date. However the carbon market has developed in a very different way as its earliest transactions were forwards. This happened because the cap and trade system was announced years before companies were actually allocated any emission allowances and therefore spot transactions were not possible. Accordingly over-the-counter (OTC) forward transactions were the first transactions pioneered in this market. The first of such trades took place in February 2003 between Shell and Nuon Energy.

*In recent weeks BRAVE Partners has written about the state of and outlook for the carbon market. Notwithstanding the fact that the outcome from Copenhagen was most unsatisfactory, the market for carbon and related investments continues (for now).*

A forward on carbon is a contract for delivery of a fixed quantity of the underlying (allowances or credits<sup>1</sup>) for a fixed price (agreed today) on a fixed future date. The contract is settled with physical delivery of the asset.

The lack of transparency in the beginning made it difficult to price forwards. As the volume of transactions has risen transparency has improved. But despite the great improvement in transparency, the market for forwards is still risky, primarily because of delivery risk and regulatory risk.

Sovereign investors (or States that actively trade allowances in order to meet their reduction targets) have been active in this market since its creation. However compliance investors (companies emitting carbon and subject to emissions controls) are also becoming more active.

Since the introduction of a spot market and the creation of futures and options markets, together with an increase of liquidity in all markets, the forward market has greatly increased its pricing accuracy.

### SPOT TRADES:

On 28<sup>th</sup> February 2005 the spot market was opened. On this date companies received their emissions allocations following the approval of the National Allocation Plans (NAPs). In spite of this, spot prices only started to be regularly quoted in September 2005.

In the spot market, when you buy an allowance or credit on a spot basis, you will immediately receive a certificate recording how many allowances or credits you have bought.

From the beginning of 2005 until April 2006 (during Phase I of the market), emission allowances traded above €20 per tonne. But due to a significant over allocation of emission allowances the spot price plummeted to below €15 per tonne and began a steady decline to a price of below €1 per tonne in early 2007. Prices never recovered in phase I. However the NAPs for phase II (2008-2012) seem to have avoided the previous phase's over allocation.

The spot market is used mainly by compliance investors. It is a good way for companies to make sure they will have the necessary allowances to meet their compliance target.

---

<sup>1</sup> **Certified Emission Reductions (CERs):** A Kyoto Protocol unit equal to 1tCO<sub>2</sub>e. CERs are credits issued for emission reductions from Clean Development Mechanism or CDM project activities. CERs are a certificate, just like a stock. A CER is given by the CDM Executive Board to projects in developing countries to certify they have reduced greenhouse gas emissions by one tonne of CO<sub>2</sub> per year.

Developed countries buy CERs from developing countries under the CDM process to help them achieve their Kyoto targets. In October 2004, the EU adopted a Linking Directive that allows companies to buy CERs from the Kyoto CDM mechanism to meet EU ETS emission allowances, thus making European industry take very strong notice of the CDM market.

**European Union Allowances (EUAs):** the allowances in use under the EU ETS. An EUA unit is equal to 1tCO<sub>2</sub>e.

## FUTURES:

The carbon futures market evolved following the creation of the spot market. A well established, liquid spot market made possible the creation of a whole range of derivatives products and futures were the first to emerge.

A carbon futures contract is similar to a carbon forward contract. Both instruments are an agreement between two parties to deliver a certain number of allowances at a specific date in the future. However, futures are standardized products which are traded on exchange whilst forwards are OTC. In the futures markets the positions taken are “marked to market” on a daily basis.

The most liquid market for carbon futures is the European Climate Exchange (ECX) which accounts for c90% of on exchange trades.

The price structure of a futures contract is the same as for a forward contract. However counterparty risk is reduced by the “mark to market” mechanism. The most frequently traded contract is based on an underlying EUA. Despite the price collapse in 2006, futures volumes has continued to grow.

Since March 2008, ECX has introduced a second futures contract using CERs as its underlying asset. The contract immediately became popular. However CER futures trade at a significant discount to standard EUA futures because of delivery risk.

Investors active in this market are again mainly compliance investors. The need for investors to meet their emission requirements underpins the increasing liquidity in this market.

Strong volumes in this market have increased and will continue to increase liquidity and therefore efficiency. This market is also expected to serve as a base for the continuing creation of structured products in future.

## OPTIONS:

The ECX launched the option market for allowances (EUAs) in October 2006. As was predicted, a liquid underlying market contributed to the development of this market.

A call option on an allowance gives the buyer the right to buy carbon emission allowances at a specific price on (or before) a specific future date. A put option on the allowances gives the buyer the right to sell those contracts at a specific price on (or before) a specific future date.

The price is arrived at in the same way as with other options. The variables are the strike price, the time to maturity, the volatility of the underlying asset and the interest rates. The challenge with these products is to measure volatility which is affected by the risks associated with the underlying.

The most liquid market for options on allowances is again the ECX. Meantime the CER option market which launched in mid-May 2008 has already had significant amounts traded.

The options market is not just capturing the attention of compliance investors. Financial investors have also been active in the market since its creation.

The outlook for the options market is expected to be strong. As the market grows, it will likely receive increased attention from financial investors, and as a result, liquidity will increase further.

### **SHARES IN COMPANIES INVOLVED IN CARBON REDUCTION PROJECTS:**

Investors can achieve an exposure to the carbon market by investing in companies that are somehow involved with carbon reduction projects which, in turn, are awarded CERs, depending on their success.

Carbon emission reduction projects, known either as Clean Development Mechanism (CDM) projects (Annex I countries) or Joint Implementation (JI) projects (Non-annex I countries), can be directly undertaken by compliance companies or by third party investors. For example, Climate Change Capital and Eco-Securities are both engaged in carbon reduction projects.

Investors in this category expect that carbon reduction projects with a potential to generate a certain amount of CERs in the future will deliver at least the amount of reductions expected or possibly exceed the amount of reductions expected. Investing in companies involved in carbon reduction projects clearly involves exposure to delivery risk since it is likely some projects are yet to be validated and CERs will either not be forthcoming or not as numerous as expected.

The gains from investment come from the difference between futures prices today and spot prices in future.

Companies such as Eco-Securities and Trading Emissions are listed and are therefore easy to invest in. In order to get exposure to CERs, investors can buy shares in companies like these but the efficacy of this strategy has not really been proved over time (given the early stage nature of this type of investment).

The incredibly low volume of shares traded indicates that shareholders must see these investments as a long term strategy. In fact, the percentage of shares freely tradable in the market is only 14.28%<sup>2</sup>.

Investors in these companies have a long term perspective. It is noticeable that investment banks are currently large shareholders since they want to cooperate with the specialized companies to cash in on this market by leveraging their know-how both now and in the future.

It is worth noting that investment banks' deep relationships with specialised companies has led and will continue to lead to further market activities, which we will come back to later.

It's hard to evaluate the future potential of this segment, for the reasons we discuss above. However, commentators confirm that the universe of investors involved in this segment is growing. EcoSecurities have been quoted as saying that "(we) see more companies entering this market (as it continues to grow)."

---

<sup>2</sup> Eco-securities Website, 2008

## CARBON FUNDS:

Carbon funds are “equity type” entities that invest in CDM/JI projects. For financial investors, the return on investment is given by the possibility of trading related credits spot (once they are generated) and/or on the forward market. However, for compliance investors, there also are carbon funds that will return the credits to the investors for use in a compliance context.

Carbon funds include delivery risk which investors find very difficult evaluate.

The World Bank led the way in the sphere of carbon funds when they set up the Prototype Carbon Fund in 1999, a \$180m fund. Today the World Bank has more than \$1.6 billion under management invested in funds focused on returning the credits to companies and States (i.e. compliance type investors).

Today, the biggest private carbon fund is Climate Change Capital’s Carbon Fund II, which has €700 million of assets under management. Climate Change Capital is an investment bank which specialises in environmental investments and it has total assets under management of almost €1 billion. Other notable private carbon fund managers include Natsource, Trading Emissions, European Carbon Fund, Eenergy International and Camco International. Some of them are listed on the London Stock Exchange's Alternative Investment Market.

The increasing capitalisation level of carbon funds indicates the growing appetite of investors for the carbon market. Financial investors are looking at this new asset class as an alternative means of increasing their portfolio diversification.

Not only is the appetite of investors increasing but their risk considerations are also changing. The lack of reliable information on project technology used to be the main inhibiting factor keeping investors away from these products. Investors were afraid of investing in funds which might focus on projects using ineffective carbon emissions’ reduction technology as this might lead to the capital invested being wiped out.

However, investors now seem to have a better understanding of the technology risks of projects and this can be seen in the exponential increase in carbon funds assets under management.<sup>3</sup>

This product category is likely to grow in future in line with increased interest in carbon investment opportunities amongst financial investors.

## SECURITISATION:

In this context we take “securitisation” to mean the issuance of a debt instrument whose underlying assets are, for example, CDM projects expected to generate CERs. In this example, the proceeds from selling the CERs create the cashflows used to pay the coupons and redemption value associated with the debt.

---

<sup>3</sup> World Bank – State and Trends of the Carbon Market 2008

Obviously, investors in these kinds of securitisations are exposed to delivery risk since it is uncertain at the outset of a CDM project whether the underlying projects will generate CERs as expected. However the price risk of the CERs could be hedged using futures.

Given that this product category is in such an early stage of evolution, there is no information as regards volume, although we're aware that private deals have been done.

The main reason for this product category being slow to develop is that the market is so new that data availability, especially in relation to delivery risk, is too limited. Moreover, the sub prime crisis has clearly dampened the overall demand for this product category anyway.

We assume that a wider range of securitisation type products will become available when delivery risk data becomes more comprehensive over time. From a technical point of view it is not really difficult to securitise CERs. There are already large numbers of commodity securitisations and the techniques associated with these can easily be transferred.

### **STRUCTURED NOTES:**

We are aware of structured notes whose payoffs are dependent on the price of futures based on EUAs. We suspect that there may also be products whose payoffs are dependent on futures based on CERs or even dependent only on spot prices. Payoff patterns vary among structured notes in the sense that for some products the principal redemption amount is dependent on the price of the carbon and in other notes only coupon amounts are dependent.

Very few structured notes involve delivery risks, because their payoffs are generally dependent on the difference between the market price of the underlying and the strike, and not on their physical delivery.

Since structured notes are so new, no volume information is available.

We assume that the main investors in structured notes are financial investors since no CERs are physically delivered to those who invest. However, depending on the price of these structured instruments, compliance investors may purchase them as a hedging tool.

Structured products have grown considerably in other product markets. This being the case, much of the technology required to create further structured products in the carbon space is available within banks to be transferred.

We predict that the growth of this market could be considerable although caution that such growth is clearly dependent on price.

### **RISK AND HOW IT CAN/COULD AFFECT THE DEVELOPMENT OF PRODUCTS:**

The main risk that has defined the framework of carbon product types is delivery risk since it is a risk unique to this market. Delivery risk is so difficult to quantify that it constrains certain products from

being developed. For now exotic products are still in a very early stage of development. Moreover, the level of sophistication varies between products but innovation is gradually shifting towards the higher end.

But most importantly of all, given the Kyoto agreement expires in 2012 and given the talks in Copenhagen have failed to provide clarity to underpin what has been a massive growth in a range of carbon related products there is also considerable regulatory risk to try to account for in this market.

### **BRAVE Partners services**

BRAVE Partners is an advocate, for liquid, mature carbon markets. The firm can advise clients on the most efficient use of the existing carbon markets as well as on the future direction of carbon markets and products.

### **Interaction**

If you enjoyed this commentary and would like to receive a weekly update by E-Mail, then please contact BRAVE Partners on [commentary@bravepartners.com](mailto:commentary@bravepartners.com)

If you would like to comment on the content of this piece, then please send an E-Mail to [discussions@bravepartners.com](mailto:discussions@bravepartners.com)

### **IMPORTANT NOTICE:**

This article should not be regarded as a basis for investment. Brave Partners have produced this note for information purposes only. It is not our intention here to provide investment advice.

- *Despite the lack of progress in Copenhagen, carbon markets continue to develop in liquidity and products.*
- *BRAVE Partners advises on the most efficient use of the existing markets as well as the likely future direction of development of carbon markets and products.*

[enquiries@bravepartners.com](mailto:enquiries@bravepartners.com)

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