



Carbon 101 – Carbon Markets, Terminology, Buyers and Sellers

1. Terminology

Carbon Credits

This is the generic term that refers to a tradable commodity that represents 1 ton of CO₂. Carbon credits take two forms:

Carbon Allowance.

Carbon allowances exist only under a cap and trade system. An allowance can be best considered as a license to emit 1 ton of CO₂e. Allowances are either auctioned or given to capped entities by the body responsible for administering the cap and trade system. Under the EUETS the carbon allowance is the EUA.

Carbon Offsets.

The output of a carbon offset project. The offset project either reduces CO₂ emissions or absorbs CO₂. To be tradable the offsets have to meet certain standards. Under the EUETS the most traded carbon offset is the CER. Increasingly we will see the ERU carbon offset traded. CERS come from CDM Projects, ERUS from JI Projects.

Cap and Trade Systems.

In a given geographic area, significant emitters of CO₂ are placed under a cap. This cap typically reduces year on year. The emitter each year has to surrender enough carbon allowances and offsets to match his cap in the same period. Failure to do so typically results in a punitive charge for each ton of CO₂ shortfall. Under a cap the emitter has a number of choices. It can reduce emissions locally, purchase offsets, or a combination of both.

The carbon market is used to find the cheapest forms of CO₂e reductions. Generally speaking, the old industrialized countries are cleaner per unit of production than the developing world. It may be cheaper to reduce emissions in China than in Germany. Carbon markets enable the maximum amount of carbon dioxide emissions to be found for the minimum cost. This all works well provided carbon offsets are what they purport to be. This has led to the development of carbon standards.

Compliance and Voluntary Markets

Compliance Markets

These markets exist due to cap and trade legislation. Entities such as power stations and industrial facilities have their carbon emissions capped. They buy carbon offsets because they have to.



The largest compliance market is the EUETS which covers EU countries. In total some 10000 entities are capped. The EUETS started in January 2005. In the US, there is no compliance market yet – cap and trade is however supported by the Obama administration and legislation is likely to be passed by the end of 2010. In the absence of a Federal compliance market, there is one regional cap and trade, the Regional Greenhouse Gas Initiative (RGGI) which started on January 1 2009. It caps power plants from Maryland to Maine. Two others are under consideration on the West Coast and in the Mid West.

Voluntary Markets

Buyers in this segment buy carbon offsets because they want to. They are not compelled to. These buyers fall into two camps. Firstly, individuals can purchase offsets to offset their carbon footprints. A number of websites have both tools to calculate carbon footprints and to buy offsets on line. Secondly, corporations, NGOs, and government departments buy carbon offsets to enable them to claim "Carbon Neutrality", as a marketing/PR exercise. The number of institutions doing this has increased substantially in the last two years. This is not an inconsiderable commitment for these institutions to make. They will have to purchase carbon offsets each and every year they wish to claim carbon neutrality.

Carbon Standards.

If a carbon offset is a tradable commodity, it needs to follow a standard. Numerous standards exist and they generally seek to establish the following:

- Verifiable. The carbon offset project actually exists, the ton of carbon dioxide avoided or sequestered did actually occur, it was measured to a defined standard and the entity claiming ownership of the credit does indeed own it.
- Additional. Carbon offset projects can only claim to be effective if they can demonstrate they only happened as a result of the carbon markets. An example of this is a landfill that in the normal course of events would emit methane as the buried organic matter deteriorated. Methane is a very strong greenhouse gas (roughly 20 times more destructive than CO₂). In the absence of carbon markets there would be no economic reason for landfills to capture methane. It is true the methane has a use (e.g. Power Generation) but the capital cost typically cannot be justified with revenues only from electricity sales. However, the economic argument changes if the landfill gases can be converted into carbon credits and sold. Such a project can be considered as additional.
- Permanent, non reversible. To ensure the claimed CO₂ reductions are unlikely to be reversed in the future. If emissions are reduced at source (switching to a cleaner fuel for example), the permanence question is unlikely to arise. Forestry projects are different. CO₂ is absorbed into trees and can be released again if there is a forest fire or the trees are allowed to die and decompose. Standards ensure that these scenarios are addressed.



2. Buyers and Sellers of Carbon Credits

2.1 Compliance Markets

Compliance markets are much easier to understand than the voluntary markets.

- 98%+ of the compliance market activity is in EUETS credits, EUAs and CERS.
- The compliance market in 2007 was \$80Bn, and over \$120Bn in 2008. This is roughly 250 times larger than the voluntary markets.
- The markets are very liquid, and a substantial proportion of the trading is done through exchanges, such as the European Climate Exchange (ECX).
- There is a lot of market transparency. Closing prices and volumes are released every trading day.

Some areas of the market are less transparent. A significant amount of buying and selling is transacted in “Over the Counter” (OTC) trades (Deals between two parties outside of an exchange). This makes market price discovery less clear. Credits known confusingly as “Primary CERS” are typically traded OTC. These Primary CERS come from projects that are under consideration, rather than registered projects (which produce “Secondary CERS”). Typically Primary CER Trading is done between a large buyer, such as capped entity and a project developer. The project developer can sell ahead his potential credits and bring cash into his project at an earlier stage. The buyer in return will pay less for each CER as they carry more risk than a secondary CER.

The Compliance markets have considerable churn (credits bought and sold more than once). The following illustrates this - (numbers have been rounded for clarity)

EUETS area total emissions per year	3Bn TCO ₂ e
% of total under Cap in EUETS	50%
Total required EUAs and CERS per year to meet cap	1.5Bn TCO ₂ e
Average CER/EUA Price	20 Euros
Total Market per year of EUAs and CERS if transacted once	30Bn Euros

With a 2008 market of \$120Bn, or 90Bn Euros, it can be seen that on average each EUA/CER is bought and sold 3 times.

The above analysis is deliberately simplistic but it does illustrate the trading that exists beyond the capped entities basic requirements.

This additional activity is driven by a number of factors including

- Financial institutions taking positions in carbon. This is no different to the trading they do in equity and bond markets.
- Capped entities exercising hedging strategies (Buying and selling at different times) according to their needs and view of the market price.



- Investors buying into the market as an “Alternative” investment. In 2008 a Carbon Exchange Traded Fund (ETF) was launched. It was designed to track the carbon markets, therefore opening up carbon to individual investors and traders.

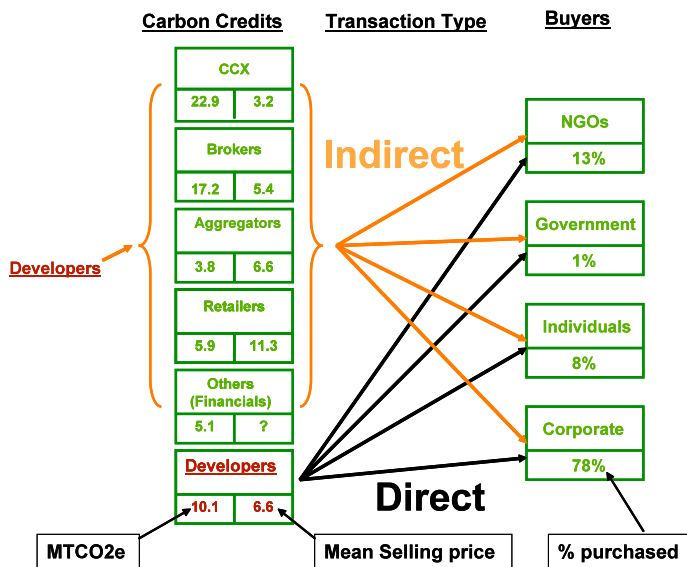
2.2 Voluntary Markets

Voluntary markets are approximately 4% of the size of the compliance markets in \$ terms, but have experienced higher growth of >200% each year since 2006. Total worldwide transactions in the voluntary markets were estimated as \$330m in 2007 and >\$800m in 2008.

In comparison to the compliance markets, they are harder to track and understand

- There are numerous standards. Each standard commands a different market price
- There is only one standard voluntary carbon credit that is traded through an exchange. This is the Chicago Climate Exchange CFI. Other standards of voluntary carbon credits are sold in OTC trades. As such there are no published closing prices of these credits.

The table below shows the buyers and sellers of Voluntary Carbon Credits in 2007



Developers sold credits either directly to end users (Buyers) or through intermediaries as shown above. 22.9 million tons was sold through the Chicago Climate Exchange (CCX) at an average price of \$3.2/ton. This route to market is attractive for developers as it is the most liquid and transparent.



A number of middlemen exist to market voluntary credits. Retailers buy the credits directly from the developers and use their expertise to sell them to the end user in OTC trades. Brokers find buyers and arrange the deal between the developer and buyer.

The challenge for a project developer is how to get the maximum revenue for his future credits. The CCX offers simple and low cost transactions, high volumes in an exchange environment, and a wide array of acceptable offset project types. The downside of the CCX is the market price per ton of Carbon tends to be lower than the prices achieved through other Carbon Standards in OTC trades.

The 2007 headline voluntary market figure of \$330m is the total number of transactions by all parties. It can not be equated to the number of offsets issued by the project developers. Once an offset has been sold by a developer it may be sold or resold through the supply chain of brokers, retailers and financial institutions until it finally gets retired. We estimate this churn is between 3 and 5 times indicating that the supply of credits into the voluntary markets was approximately 30 mTCo_{2e} in 2007 and 50 mTCo_{2e} in 2008. These numbers could be +/- 30%.

2008 saw an improvement in the transparency of voluntary carbon markets. The California Climate Action Registry and The Gold Standard opened registries which enable anyone to see by project all relevant documentation, project status, and the number of credits issued. The Voluntary Carbon Standard plans to launch its own Registry in 2009. The TZ1 registry was also launched which is the first "Standard Agnostic" Registry. Carbon credits of different standards can be included on the TZ1 registry, further expanding the transparency of this market. A registry is not an exchange however. Transaction prices are not shown on these registries; they are a way of tracking issuance and retirement of carbon credits.